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REHABILITATION FOR EMPLOYMENT: TRAINING THE PHYSICALLY DISABLED IN COMPUTER-RELATED FIELDS

by

SHEILA ABRAMS

(C)

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Rehabilitation for Employment: Training the Physically Disabled in Computer-Related Fields," submitted by Sheila Abrams in partial fulfilment of the requirements for the degree of Master of Education in Vocational Education.

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Date April 12, 1984

ABSTRACT

The purpose of this study was to describe pilot research in training five severely physically disabled persons for employment in computer-related jobs, and in reducing employer reluctance to hire the physically disabled. For purposes of comparison with this study, two similar studies and a model rehabilitation institution are discribed. In order to establish the climate in which the pilot research was initiated, previous research which led to the conclusions that physically disabled school children do not have equal educational opportunities with the physically able and that the rate of unemployment among the physically disabled is high, is also described. The author was able to include a description of the implementation phase of the research, the establishment of a vocational training center, and follow-up data regarding the five pilot study participants. Evidence was provided that, with only minor modifications to furniture and equipment and the use of simple mechanical devices and specialized peripheral electronic equipment, the severely physically disabled can become competent in computer-related skills, although some with particular handicaps will require controlled work environments. By the end of the first year of the implementation phase, nine of the thirty students were employed

either part or full-time. Another outcome observed was the positive social/psychological effects on the participants.

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CHAPTER I

INTRODUCTION

The United Nations designated the year, 1981, as the International Year of the Disabled. This designation served to draw public attention to a fact, already well known by the great numbers of physically disabled persons in Canada, that this sector of the population has been badly neglected. Besides the limitations imposed by handicaps, this group must also face barriers to education, vocational training and employment--barriers that result from such diverse circumstances as the inaccessibility of public buildings and transportation systems, the inavailability of educational and vocational training opportunities, and even the lack of acceptance of the individual in the social milieu. All of these barriers are commonly cited as causes of one of the most serious problems faced by the severely physically disabled: chronic unemployment, and the consequent social, psychological and economic effects on the individual. The right to the education and/or vocational training which could lead to economic independence and a greater degree of acceptance in the business and social context is being denied to a substantial sector of Alberta society.

Although an actual census has not been carried out, a 1978 study conducted by Jan Brehaut, a research officer for Alberta Social Services, provided estimates of the physically disabled in Alberta (Note 1). By applying statistics from the Canadian Sickness Survey, 1950-51, published by the Department of National Health and Welfare and the Dominion Bureau of Statistics, and the National Health Survey, 1969-70, published by the United States Department of Health, Education and Welfare, to the Alberta situation, Brehaut arrived at estimates of from 125,000 to 213,000 in all age groups with some limitations in physical functions. A breakdown of these figures by age group and degree of limitation resulted in estimates of from 21,279 to 22,653 persons in the 17 to 44 age group who are mildly or moderately limited in functional ability, and a range of from 19,360 to 43,825 who are severely limited. In each of the above sets of estimates, the first figure was derived from the Canadian survey and the second from the United States survey. Brehaut (Note 1) expressed the opinion that the United States survey statistics were probably more representative of the numbers of physically disabled in Alberta than the Canadian survey statistics.

To date, the Brehaut estimates of the numbers of physically disabled in Alberta are all that are available regarding persons in all categories of impairment. The design phase of a study which is expected to result in more reliable estimates was recently completed under the

sponsorship of the Alberta Rehabilitation Council for the Disabled (Note 2). Funds for the continuation of this study have not been made available, so it is not known when the statistical analysis will be completed.

It is toward the vocational habilitation of rehabilitation of the estimated 19,360 to 43,825 individuals with severely limited functional ability (Brehaut, 1978) that the problem of this thesis is addressed.

The Problem

Broadly speaking, the problem was that of unemployment experienced by physically disabled persons in Alberta. More to the point, there was a need to develop a model to demonstrate the feasibility of training the physically disabled for employment. The growing field of computer technology was chosen as the milieu, and a pilot study was initiated. Specifically, the research was designed to answer the following questions:

1. Can computer technology be applied in a manner which would provide equality of opportunity for employment for physically disabled persons?
2. Can physically disabled persons be oriented to the field of computer technology and be trained to operate and program computers?
3. Will the ability to operate and program computers increase the employment potential of physically disabled persons?

4. What social and psychological effects will vocational training in computer technology have on the physically disabled?
5. Can social and psychological barriers to the employment of physically disabled persons be reduced by liaison with employers?

Purpose of the Study

A survey of physically disabled adults in Edmonton revealed a pattern of chronic unemployment, or underemployment in "make-work" projects, and extreme frustration resulting from the inability to do productive work and, thereby, gain economic independence. An attempt to alleviate this problem was a pilot study of the feasibility of training physically disabled persons for employment in computer-related jobs. The major objective of the pilot study was to design and develop a model on which a vocational training institution for the physically disabled could be patterned.

Additional objectives of the pilot study were the following:

1. To orient physically disabled participants in the field of computer technology, and to train them to operate and program computers;
2. To design and develop technical aids and operational procedures to overcome physical barriers for the participants;

3. To establish an environment which would tend to reduce social and psychological barriers encountered by the participants;
4. To reduce the apprehensions of prospective employers regarding the employment of the physically disabled; and
5. To develop a method to aid in the employment placement of the physically disabled.

The Definitions of Terms

The following terms are defined in accordance with their application in this study.

Participants. The five physically disabled persons who took part in the pilot study are referred to as participants.

Impairment, Physical Disability and Handicap. An effort was made by the writer to conform with definitions which were written as a result of opinions expressed in a World Health Organization survey, and which are expected to come into common usage. With the exception that references to mental function were deleted because the participants in the pilot study have no observable mental impairments, the World Health Organization definitions (Smith, 1981, p. 186), quoted below, were used in this study.

> Impairment is a generic term that embraces any disturbance of or interference with the normal structure and functioning of the body . . . . (It is characterized by a . . . psychological or anatomical loss or abnormality, and includes the existence or occurrence of an abnormality, defect, or loss of limb, organ, tissue, or other structure of the body, or in a functional system or mechanism of the body.)
>
> Disability is the loss or reduction of functional ability and activity that is consequent upon impairment. (It is characterized by excesses and deficiencies of behavior and other functions customarily expected of the body or its parts. It involves functional limitation and/or activity restriction.)
>
> Handicap is the disadvantage that is consequent upon impairment and disability. (It represents the social and environmental consequence to the individual stemming from the presence of impairment and disability.)

Controlled Work Environment. A controlled work environment is an environment in which severely disabled persons who, because their handicaps prevent employment in the regular social and/or physical setting of a work place, are employed in surroundings with a minimum of impediments, and

in which they are able to function.

Delimitations

Although the focus is primarily on a description of the pilot study, the writer felt that, in order to explain the impetus for the pilot study, it was necessary to identify circumstances which led to its inception. Hence, the first phase of a research project to introduce vocation-related competencies to students in the Glenrose School Hospital is described. Also, a description is provided of a survey conducted to determine if physically disabled persons are competitive with the able-bodied in the employment market.

For the purpose of comparison with the pilot study, other studies in the use of computer technology in providing employment skills for the physically disabled are described.

Since the conclusion of the pilot study in April of 1982, contacts with the five participants have been maintained by the writer. Also, the implementation phase of the research was commenced with the establishment of the P.H.O.E.N.I.X. Training and Development Center, a vocational training school which utilizes computer technology to train the physically disabled, and which is expected to embody a controlled work environment. As the current activities of the participants are closely connected with

the institution mentioned, the follow-up to the pilot study will include both a description of the implementation phase of the research and data concerning the participants.

Limitations

Data presented in this study are based on empirical evidence--on information gained through structured and unstructured interviews and by experience and observation, rather than on evidence gained through the application of statistical methodology. The writer's interpretation of data and lack of technical knowledge in the electronics field may be considered as limitations of this study.

This study is also limited by the method used in the selection of participants, and by the number of participants in the sample relative to the number of physically disabled persons in the population.

Another limitation of this study is that records of procedures followed and methods used in training and in overcoming physical, social and psychological barriers were not comprehensive.

The scarcity of literature concerning the training of physically disabled persons in the operation and programming of computers is an additional limitation of this study.

Assumptions

There are several assumptions on which this study was based.

1. It was assumed that Brehaut's (1978) estimates of the prevalence of the physically disabled in Alberta give reasonably accurate ranges within which the actual numbers of physically disabled are distributed.
2. It was assumed that the conclusions and recommendations which were made following the Glenrose School Hospital research were reliable.
3. It was assumed that data received as a result of the survey of physically disabled adults in Edmonton were as accurate as the subjects of the survey were able to recall, and that the subjects were representative of the physically disabled population in Edmonton.
4. It was assumed that information received from the five individuals who participated in the pilot study was as accurate and as comprehensive as the individuals were able to provide.
5. It was assumed that information received from the persons who were responsible for the instruction of the pilot study participants and for the recording of data was as accurate and as comprehensive as those persons were able to provide.

Significance of the Study

The outcomes of the pilot study could influence both provincial and federal government policy regarding the habilitation and rehabilitation of physically disabled adults, vocational training programs and institutions for these people, and the controlled work environment concept. The achievement of economic independence by individuals previously dependent upon government handouts could have a substantial beneficial impact on government expenditures for social welfare programs and on government revenues via Income Tax, Alberta Health Care, Unemployment Insurance, and Canada Pension Plan payments.

This study may be significant to prospective employers and to associations which provide services to the disabled in that it documents evidence that physically disabled persons can be trained for productive employment.

This study may also have significance for educators in the areas of teacher training in vocational education, of mainstreaming physically disabled students in regular schools, and of the development of early assessment procedures to identify abilities and aptitudes which would enhance the individual student's vocational competencies.

Researchers in psychology and in sociology may find this study of significance in the areas of changes in attitudes, and changes in the social and economic aspirations and quality-of-life of physically disabled persons.

Frame of Reference

This thesis is essentially descriptive and deals primarily with a pilot study of the feasibility of developing computer-related vocational skills in the physically disabled and, thus, reducing the problem of unemployment for these people. In order to introduce the reader to the climate in which the pilot study arose, the writer described circumstances which revealed the urgent need.

Chapter II is a review of other projects in which physically disabled persons were being trained in computer applications, and the description of a model rehabilitation center.

Chapter III is a description, first, of research which served to point out the fact that physically disabled students in Edmonton schools were not acquiring vocational competencies in any systematic manner, second, of a survey which revealed that the same circumstance applied to physically disabled adults in the area, and third, of the establishment of a foundation to raise funds for a school to provide high-technology training and a controlled work environment for physically disabled adults.

Chapter IV concerns the pilot study--the setting, the equipment used, the technical innovations or modifications required to reduce the severity of the handicaps of the participants, and the achievements of the training program. The case study method is used to present data, with arbitrarily assigned alphabetic labels to identify each of

the participants and, at the same time, to ensure the confidentiality of personal data. Each case study gives background information regarding physical disabilities, education, work experience, community service and special interests, as well as an accounting of successes achieved in the use of computers.

A time extension for this thesis allowed the writer to include data obtained up to 18 months after the conclusion of the pilot study. Chapter V presents a description of the implementation phase of the research--the founding and operation of the P.H.O.E.N.I.X. Training and Developmental Center. Also, as all five of the participants were closely involved with the implementation phase of the research, follow-up data concerning these individuals are presented in Chapter VI.

Chapter VII contains a summary of this thesis, the conclusions reached, and recommendations for further research.

Chapter Summary

This chapter introduced the problem of unemployment faced by the physically disabled, a substantial sector of the population of Alberta, and outlined the aims of a pilot study to develop a model which could be used in the establishment of procedures and facilities for the training of the physically disabled for employment in the field of computer technology.

CHAPTER II

COMPARATIVE PROJECTS

Introduction

The use of the computer has reduced the need for repetitive, manipulative functions, for mobility, and for physical strength in the performance of many of the tasks required for job performance and, thus, has opened the way to employment for those who have been barred from the work force because of physical impairments. Although there have been many programs in the past aimed at rehabilitation, the application of computer technology in this field is relatively new.

For the purpose of comparison with the pilot study and first year of implementing a high technology training program, descriptions of two other research projects are herein provided. Both of these studies--one at Michigan State University in Lansing and the other at the University of British Columbia in Vancouver--emphasize, first, the need for technical accommodations in training severely physically handicapped persons in the use of computers and, second, the need for team work in placing these persons in the work force. With regard to these research objectives, Woolridge (1982) stated that, "During the last five years

there has been an increasing awareness of the significant impact that rehabilitation technology and vocational accommodations can have on vocational outcomes with clients having physical limitations" (p. 159). Woolridge's assertion was supported by Nelson (1982), who recommended that a rehabilitation engineer, ". . . someone with the background, inclination and time to delve into the technical complexities of selecting appropriate equipment and designing hardware and/or software applications . . ." (p. iii) was necessary because of the complex nature of the development of technical aids to rehabilitation.

The Human Resource Center in Albertson, New York, is a rehabilitation model which encompasses a number of functions, ranging from maintaining a research-oriented pre-K to 12 school for physically disabled children to the operation of industries for the employment of the handicapped. This organization has objectives comparable to the research described in this thesis. For that reason, an account is given of the major functions of the Center.

Vocational Rehabilitation of the Severely Disabled at Michigan State University

One of the problems that reduces employment possibilities for many of the physically handicapped is their inability to manipulate the tools of the workplace. In a program presented at a conference sponsored by the National Research Council of Canada, Woolridge (1982) addressed this

problem. He described a project at Michigan State University in Lansing which involved 200 severely disabled persons. This project, designed to ease the transition of the severely disabled person from dependency to productivity in the field of computer-related work, used a team approach to rehabilitation. The team consisted of a rehabilitation engineer who worked closely with an occupational therapist, a vocational counsellor who was also a placement specialist, an equipment adaptations designer, a technician, and an office manager (p. 159).

Rehabilitation Engineering

The focus of the Michigan State University research was on the technical aspects of rehabilitation work. Woolridge observed that ". . . the majority of problems confronting clients are very basic and require simple, low-technology, low-cost solutions" (p. 159), and described the four-level classification of methods of reducing these problems and, thereby, reducing barriers to employment. The following are the four classification levels:

1. The use of common, commercially available products such as electric staplers;
2. The use of commercially available products as in the first level, but with technical modifications to permit their use by clients with particular handicaps;
3. The use of simple, custom-made aids and devices; and
4. The use of complex aids and devices, specialized

equipment, and computer applications (p. 160).

Woolridge suggested that the accommodations described in the first level could be supplied by any observant member of the rehabilitation team, but devising the second level accommodations would require the skills of a technician. For the third level accommodations, he advised the cooperation of an occupational therapist and a technician in determining what aids and devices are needed, and the construction of these to meet the requirements of the client. For fourth-level accommodations, he stated that the services of a rehabilitation engineer were required. The engineer, by following advice and suggestions from other team members, would make the necessary modifications to equipment (p. 160).

Cooperation as the Key to Success in Rehabilitation

Although the focus of his paper was on rehabilitation engineering, Woolridge cautioned that technical applications should be considered as only one facet of rehabilitation. He suggested that, for the rehabilitation process to be successful, the rehabilitation team must take into consideration both the ". . . content and the context of a given problem. The content consists of the aids and devices; the context is the social or physical environment in which the aids or devices are placed" (p. 160). He was concerned that a major problem with rehabilitation efforts is that insufficient attention is paid to the context. There is not much point in breaking down one barrier if

others remain in place. In considering the "context" of rehabilitation, the team at the University of Michigan worked closely with personnel of Michigan Rehabilitation Services, the State Department of Education, the Artificial Language Laboratory at the University, and the State Technical Institute and Rehabilitation Center (STIRC), as well as with personnel of other specialized services. Successes achieved in the project were attributed to the fact that a number of agencies and services were employed to work in cooperation to attain common goals--the successful employment of the clients.

Woolridge cited an example of how the cooperation between rehabilitation professionals and private industry personnel played an important role in the rehabilitation process. In a data processing training program, representatives of businesses aided in the design of curriculum, monitored student progress and, also, assumed the responsibility of placing graduates within their own businesses (p. 163).

Although the Michigan project was terminated after two and one half years because of a lack of funds, the job placement record was high, demonstrating that rehabilitation technology combined with supportive services can reduce barriers to employment for the physically disabled.

Vocational Rehabilitation of the Severely Physically Disabled at the University of British Columbia

In British Columbia, the Ministry of Health operates a Health Surveillance Registry to provide data regarding the physically disabled population of the province. In the 1980 yearly report published by the Registry, an estimate of the number of severely physically disabled population of the province put the minimum at over 12,000 (Graystone, 1982, p. 50). Of this number, it was estimated that those ". . . who are most in need of technical aids and, in particular, microcomputer operated devices, are the 916 who are blind, deaf or speech impaired and who . . . represent the greatest challenge to modern microcomputer technology" (p. 56). The Registry estimates of the numbers of cerebral palsy victims and quadriplegics for 1980 were approximately 2,800 and 480, respectively (p. 56). Most of the quadriplegics were unemployed, and the level of unemployment among the cerebral palsy victims, as estimated by the Adult Services Commission of the Cerebral Palsy Association of British Columbia, was 77 percent (p. 58).

Graystone estimated that, as the cost of institutional care for a severely physically disabled person was about $90,000 annually and the cost of a modified computer was about $12,000, the vocational rehabilitation of the individual would represent a substantial saving to the taxpayer (p. 58). The Vocational Evaluation and Training Program in the Rehabilitation Engineering Laboratory at the

School of Rehabilitative Medicine, University of British Columbia, is confronting the problem by using computer technology and rehabilitation engineering to devise methods of preparing the severely physically disabled for economic independence.

Rehabilitation Engineering and Computer Technology

A number of computer modifications and technical aids for computer operators were designed by personnel of the Rehabilitation Engineering Laboratory to enable severely physically disabled persons to acquire vocational skills. Among the innovations described by Graystone were the following special interfaces:

> The standard keyboard of an Apple II computer was modified by replacing the SHIFT, CONTROL and REPEAT switches with latching switches. This keyboard, mounted on a specially constructed cabinet, may have a keyguard installed, if necessary, for a particular client. The cabinet, which may be mounted vertically, has locking knobs to permit height and slope adjustments.
>
> A printed circuit board provides access to the paddle controls by means of a four potentiometer joy-stick. A ball-joint-like control device was designed so quadriplegics could operate the joy-stick. One half of a table tennis ball was mounted on the joy-stick shaft, and control is achieved by switching the ball with a mouth- or hand-held wand.
>
> On the printed circuit board are three push buttons (PB0, PB1 and PB2). PB2 was made a latching switch so it could be used to produce upper case characters with the Supertext word processing program.
>
> The unit is connected to the Apple computer by two cables, one to the keyboard socket, and one

to the paddle socket.

> An expanded keyboard for the Apple II computer was constructed by means of a matrix arrangement of two sets of crossing bronze rods, one on a plywood baseboard and the other on the back of a plastic panel. Keyboard characters were silkscreened on the front of the panel. The SHIFT, CONTROL and REPEAT unit has latching switches and indicator lights so that it can be operated with a single hand or stylus.
>
> The expanded keyboard was connected to the computer with a 25 conductor flat cable by removing the encoder board from the back of the Apple keyboard, slipping the connector cable over the encoder pins, and then replacing the encoder board. This arrangement permits the use of both the expanded kayboard and the original Apple keyboard. (pp. 58, 59)

The work done by the rehabilitation engineers has led to commercial manufacturing of these special interfaces, and they are now available for any agency involved in the rehabilitation or employment of the physically disabled.

Cooperation Among Rehabilitation Agencies

Graystone stated (p. 59) that the use of the special interfaces had resulted in the successful employment in the computer field for several quadriplegics. This was made possible by the concerted actions of several agencies.

The rehabilitation engineers had worked as members of a multidisciplinary team in evaluating the potentials of the clients, and in establishing training procedures. Research support funds and services for the project were supplied by the University of British Columbia, the Community Vocational Rehabilitation Service (CVRS) of the Ministry of Health, and the Worker's Compensation Board. Graystone

indicated that a permanent evaluation and training facility would be established by 1982 on the university campus. This unit is expected to provide assessment services for the Worker's Compensation Board, the Community Vocational Rehabilitation Service, Canada Employment Centers, and the Insurance Corporation of British Columbia. It is also expected to house facilities for continuing research in ". . . methods of interfacing the severely disabled to a variety of vocational and teaching tools and for evaluating and perfecting newly developed technical aids" (p. 60).

The Human Resources Center - a Rehabilitation Model

Abilities, Inc.

The Human Resources Center in Albertson, New York, had its roots in a small business housed in a converted garage and operated by four physically disabled persons. This business, Abilities, Inc., founded by Henry Viscardi in 1952 as an eleemosynary corporation, obtained federal government contracts for the manufacture of electronic components. Within three years, the business had grown to employ 163 persons representative of a wide variety of disability categories (Viscardi, 1967, p. vii). Although there were many financial set-backs during periods of economic recession, Abilities, Inc., survived and formed the nucleus of a world-renowned rehabilitation model. The wide range of

programs at the Center include academic and vocational education, in-house employment, employment training and placement, independent living skills training, research, and an information publishing service.

Academic and Vocational Education. A person with severe physical disabilities is subject to experiences which may adversely affect his or her self-image (Palmer, 1980, p. 11). The overprotection and understimulation experienced in the home, and in clinical and school environs tends to have a detrimental effect on self-concept. The objective of the Human Resources School is to change this circumstance by conducting programs based on the following themes:

1. The need to develop a positive self-image.
2. The need to develop a sense of control over decisions in one's life as they relate to one's level of independence.
3. The need to enhance the career awareness of students so they can effectively make reasoned choices from a wide variety of options. (Palmer, 1980, p. 11)

These themes influence every facet of the education of the child.

Career orientation, counselling and preparation are an integral part of the regular curriculum. In addition, the school offers a wide range of extra-curricular activities intended to not only improve the self-concepts of the student participants, but to increase their physical-functional abilities as well.

Research. The research conducted at the Human Resources Center has developed into the major function, with

studies in a number of areas related to the physically disabled. Research is carried out both in the school and in Abilities, Inc., and includes: programs of assessment of students and employees; the design and development of programs in education; demonstration projects in work evaluation, training, and job development and placement; rehabilitation engineering as applied to the functional needs of personnel at the Center and in industry; and career development.

The establishment, in 1977, of the National Center on Employment of the Handicapped on the campus represented a major service to provide information which will ". . . help communities across the nation increase and enhance employment opportunities for millions of disabled Americans" (Yuker and Richards, 1979, p. 5).

Chapter Summary

As a standard of comparison with the pilot study and implementation of the vocational training and placement of physically disabled persons in computer-related occupations, two projects in the field were described. The first, at Michigan State University, applied the team approach, emphasizing the technical aspects in the content of the rehabilitation process, and cooperation among team personnel, various government agencies, and private industry in the context of rehabilitation. The second, at the University of British Columbia, uses an approach similar to that in

Michigan. Some of the technical devices and innovations which were developed in the British Columbia study are now being produced commercially. Both of the research projects were successful in training and placing clients in computer-related employment. However, the Michigan project was terminated after two years because of a lack of funds.

The Human Resources Center, begun as a government-subsidized business in 1952, provides a model for rehabilitation research and employment development in many parts of the world. This Center has objectives and functions similar to those of the subject research--the development in physically disabled adults of abilities which will permit them to function in competitive employment and, thereby, achieve economic independence and the resultant social and psychological benefits.

CHAPTER III

CIRCUMSTANCES WHICH LED TO THE PILOT STUDY

Introduction

Historically, efforts in Alberta to habilitate and rehabilitate physically disabled persons have been fragmentary, with the majority of institutions organized to provide services only to those with specific handicaps such as blindness or deafness. There have been no concerted efforts to provide services for those with the variety of handicaps represented in the physically disabled population as a whole. In response to the perceived need for such services, research was conducted to assess and to foster the growth of vocational competencies in physically disabled elementary, junior and senior high school students of the Glenrose School Hospital. This research, carried out under the auspices of the Department of Industrial and Vocational Education, Faculty of Education, University of Alberta, served to emphasize the need for the development of vocational competencies in physically disabled persons. The fact that very little was being done in this regard in either of the public or the separate school systems influenced the subsequent decision to conduct the pilot study

with physically disabled adult participants.

The three-phase Glenrose project was to be carried out over a three-year period, beginning in September, 1979. However, because of the lack of funds, the research was terminated after the first year. Consequently, only activities of the first phase, along with conclusions and recommendations which are pertinent to this thesis, are described in detail herein.

Before the conclusion of the Glenrose research, a survey of physically disabled adults, many of them Glenrose graduates, was conducted. Results of this survey reinforced conclusions reached as a consequence of the research, and also identified a group from which four of the five participants in the pilot study were subsequently drawn. For these reasons, data obtained in the survey are also described.

When it became evident that the Edmonton Public School Board was unwilling to provide funds which would permit the research to continue into the second and third years, plans were made to establish an organization which would provide vocational training for physically disabled adults. As it was not possible at that time to continue working toward the development of vocationally-oriented competencies in children, the alternative was to begin working with adults. Hence, the P.H.O.E.N.I.X. Foundation, incorporated under the Societies Act of Alberta, set about the establishment of a vocational training school. In order to obtain financial support, the pilot study was

conducted to demonstrate that physically disabled individuals with severely limiting handicaps can develop employment-related skills, and to design a model to be used in training these people for employment in the electronics and computer-related fields.

The Glenrose School Hospital Research Project

The School

The Glenrose School Hospital is operated by the Edmonton Public School Board, and is funded through the resources of both the School Board and the Board of Directors of the Glenrose Hospital. Classes range from Kindergarten to Grade 12. The school population, which is drawn from the northern half of the province, is composed of both physically disabled and emotionally disturbed students who are unable, because of their handicaps, to attend regular schools.

The majority of the students are physically disabled, and are handicapped by a variety of conditions which are the results of disease, accident, birth trauma, genetic defect, or corrective surgery. Some of the students reside in Glenrose Hospital, which is connected to the school, and some live at home and are brought to school daily in specially fitted buses.

The school building was designed to accommodate

physically disabled students, and is easily accessible by those who are required to use wheelchairs or a variety of other locomotive devices.

The staff at the Glenrose school employs a multi-disciplinary team approach to the development of individualized student programs. Each team is made up of a nurse, a physiotherapist, an occupational therapist, a psychologist, a social worker, one or more teachers and, if necessary, a speech therapist.

The school has an academic orientation, although a few vocationally-oriented courses in typing and accounting are offered. The Industrial Arts Laboratory is very well equipped but, during the term of the project, appeared to be under-utilized.

Funding the Project

In the summer of 1979, a proposal was submitted to both the Edmonton Public School Board and the Board of Directors of the Glenrose Hospital. Because the 1979-80 operating budget had already been allocated, the School Board was unable to provide funds for the release time which would have been necessary to permit teachers to assist in the development and assessment of vocational education programs and materials. However, with the support of the University of Alberta and some research money from the Glenrose Hospital Board, the project went ahead, very much restricted in scope.

The Three-Phase Plan

Originally, it was intended that the Glenrose research would extend over a three-year period, and would be carried out in four areas: Category A--Elementary School, Category B--Junior High School, Category C--Senior High School, and Category D--The Edmonton Public School system, with the activities of the various participants coordinated by a facilitator. It was expected that the unique functions of the facilitator would be identified as the research progressed through the three phases. This description of the three-phase research is made with reference to the proposal submitted to the Edmonton Public School Board and the Board of Directors of the Glenrose Hospital (A Proposal for the Development and Implementation of a Vocational Education Program for the Students of the Glenrose School Hospital, September, 1979).

Objectives of the Project

It was expected that the students who completed Grade 12 at the Glenrose school would lack vocational competencies and, thus, would experience difficulty in finding employment. Another factor which was expected to contribute to this problem was the fact that, because of nearly insurmountable physical barriers, attendance at post-secondary institutions would be impossible for many of the graduates.

A literature survey indicated that it was extremely difficult, if not impossible, for the great majority of

severely physically disabled persons to find employment which would bring financial independence. Effective job placement endeavors, one of the most notable of which is in operation at the Human Resources Center in Albertson, New York, have resulted from integrated programs which begin with the individual's formative years. The early identification and assessment of physical abilities and aptitudes enables the educator to design individual programs which include activities designed to minimize the effects of handicaps (Viscardi, 1967). It was hypothesized that if educational programs at the Glenrose school were designed to identify and develop vocational competencies in the students, their prospects of future employment would be enhanced.

The project was designed to achieve the following objectives:

1. Design and develop a system for the identification of pre-vocational and vocational competencies, and the assessment and evaluation of the vocationally and physically handicapped student.
2. Design and develop a program to provide a training environment which would stress the development of the motor and cognitive skills necessary for success in occupations available in the job market.
3. Identify occupational clusters for which students with physical handicaps may be trained. Conduct job and task analyses for occupations within these clusters.

4. Design and develop in-house and cooperative education and employer orientation programs to implement training for the occupations identified.
5. Identify the unique and necessary facilitating function in the successful implementation of a system of identification, assessment, evaluation, and job placement of the graduate with physical handicaps. Identify the functions of the facilitator in providing the optimal interfacing within the system.
6. Explore the possibilities of using current technologies to optimize students' abilities to achieve competence in social, educational and vocational environments. (Proposal, p. 2)

Category A -- Elementary School. It was intended that a program with the use of games and toys combined with physical education and occupational therapy would be employed as a means of encouraging the development of pre-vocational psychomotor and cognitive skills in the grades one to six pupils. The first-year phase (1979-1980) was to begin with grades one and two; the second-year phase was to include grades three and four, meanwhile continuing with grades one and two; the third-year phase was to introduce the program in grades five and six, while continuing with the other four grades. The research was expected to complement the academic programs already offered in the school.

The facilitator was expected to coordinate the activities of assessment, activity design and implementation,

and evaluation of individual pupils' progress. Throughout the three-year program, an experimental-control pilot study was to be conducted, and data collected and analyzed, so that individual programs could be modified as required by circumstances (p. 4).

Category B--Junior High School. The involvement of junior high school students was expected to begin with those in grade nine, and then to include those in grades eight and seven, respectively, in the second and third phases. By following this schedule, the research team expected to have data available for analysis prior to the grade nine students' progress to the Category C vocational and/or cooperative education programs in the second year of the project.

The major objective of the research in Category C was the design, development and testing of assessment materials, and the assessment of students' vocational aptitudes and interests (pp. 4 and 5).

Category C--Senior High School. It was intended that vocational education programs would be designed to develop in the students the competencies required for jobs in the clusters identified as being most likely to provide employment for the physically handicapped. The programs were expected to incorporate cooperative education with in-school academic and vocational training programs, and, possibly, to be combined with courses offered by other city high schools, the Alberta Vocational Center, or the Northern

Alberta Institute of Technology (p. 5). The facilitator, in liaison with employers in the industries identified as having the potential for the employment of the physically handicapped, was expected to place students in situations in which they would receive on-the-job experience and, at the same time, perform a public relations function in reducing barriers created by employer attitudes toward the disabled.

Category D--The Edmonton Public School System. It was intended that a survey be conducted to identify students with long-term handicaps who were attending regular schools in the system, and to document measures taken by school personnel to minimize the effects of the handicaps. Also, pilot experimental-control validation studies in the assessment of vocational competencies were to be conducted (pp. 5 and 6).

Restraints Imposed by Lack of Adequate Financial Support

The original intent of the proposal was to conduct wide-ranging research involving a number of concurrent activities. However, because of the lack of sufficient funds, it was not possible to conduct a number of the planned activities. Teachers in the school were given no release time to participate, although a number of them did contribute their time to assist in the research.

Instead of conducting the research in the four

categories as originally planned, it was conducted with grades one and two (Category A), with grades seven to twelve (Categories B and C) as one unit, and with a limited number of activities intended to benefit the school system (Category D). The role of the facilitator was not fully defined, nor was it possible to begin the design and development of cooperative education and employer orientation programs to implement vocational training (Note 3).

The Design and Development of an Assessment Recording System

In order that individualized pre-vocational and vocational education programs could be designed for the students, it was deemed necessary to assess the present status of each one so that realistic plans could be made to tailor programs to meet individual needs and interests, to capitalize on individual abilities, and to compensate for individual limitations.

Several comprehensive assessment recording systems were examined. One of these was the Progress Assessment Chart of Social and Personal Development (PAC) designed by Dr. H.C. Ginsberg. Another was the AAMD Adaptive Behavior Scale developed by the American Association on Mental Deficiency (Fogelman, C.H.). Although both of these systems were designed to rate the social and personal behaviors of the mentally retarded, the emotionally maladjusted and/or the developmentally disabled, the formats could be modified to rate the behaviors of the physically handicapped. (In

fact, the school psychologist was, at that time, adapting the PAC model to standardize psychological data required for the multidisciplinary team functions. A modified PAC model was also used, later, in the design and development of vocational aptitude assessment materials.)

Another system considered by the research team was designed under the direction of Dr. R. Evans of the University of Illinois (Albright, L.). One part of this system describes strategies which may be employed to assess levels of performance, and includes a Learner Profile form which was designed to present a summary of data collected by members of a learner's assessment team. The completed form gives a visual impression of learner strengths and weaknesses in eight areas: quantitative/numerical skills, verbal skills, cognitive skills, perceptual skills, language skills, psychomotor/physical skills, social skills, and occupational interests.

Student Profile Charts. Using ideas gleaned from the previously mentioned assessment systems, the research team designed student profile charts which were expected to provide easy access to information which could form the bases for decision making by identifying individual physical abilities and limitations, academic and vocational strengths and weaknesses, and career interests and aspirations. Data from student records were then summarized and transferred to the charts. These data were organized in the following categories:

Medical/Diagnostic Records

Educational--Assessment and Academic Records

Physical--Abilities and Limitations Records

Psychological--Assessment Records

Social--Assessment Records

Speech/Hearing--Assessment Records

Physiotherapy--Assessment Records

To maintain the confidentiality of information contained in the profile charts, a coding system was devised (Final Report, Phase I, 1980, Part II, p. 51).

The records which were made available to the researcher were comprehensive, encompassing data from the many disciplines involved in the care and education of the students. However, they represented an almost insurmountable barrier for the individual attempting to gain a capsule view of the student's physical, psychological, social and educational status. Most of the records examined dated back many years, were confidential in nature, and were too technical to have much meaning for the individual not familiar with medical terminology. Also, it appeared that, in some cases, different assessment criteria had been applied by different practitioners of the same discipline (Part II, p. 57). In order that optimal use could be made of the data summaries, it was recommended that standardized criteria be utilized in assessment, and that these standards be established by practitioners of each of the disciplines represented at the school (Part III, p. 9).

Vocational Education Program Design and Development

As a preliminary step in the design and development of individualized pre-vocational and vocational educational programs, means of identifying and assessing the physical aptitudes and limitations of the students, and methods or procedures to foster competency development were investigated. Although it was not considered in the proposal, the use of the microcomputer was introduced to both groups of students, those in grades one and two and those in grades seven to twelve.

The Use of Toys and Games to Promote Pre-Vocational Skill Development. It was theorized that the use of games and toys would encourage the development of pre-vocational psychomotor skills in young children. As a result of a survey of toy manufacturers, it was discovered that very little consideration of the needs of handicapped children is taken into account in the design of toys. The observation of grades one and two children at play revealed that they liked responsive toys and games--talking dolls, electronic games and pocket calculators. Toys and games which do not require fine motor control or physical strength to operate appeared to be favored by the children (Part II, p. 41).

The Design and Development of Vocational Skills Assessment Package. A number of commercially produced vocational aptitudes assessment, or "work sample," systems were investigated to determine their usefulness in the Glenrose

school situation. In total, seven different systems were examined--the JEVS, VIEWS, MICRO-TOWER, TOWER, VALPAR and SINGER Work Sample Systems and the BRODHEAD-GARRETT Vocational Skills Assessment Program. As these systems were designed primarily for use with disadvantaged students, they were found to be unsuitable for use with the physically handicapped, as well as too expensive for installation at the school.

Subsequently, 22 vocational aptitude and interest assessment packages were designed and developed by students in the Faculty of Education, Department of Industrial and Vocational Education at the University of Alberta. Each of the packages, designed for use with a Technicolor Roadmaster rear-screen slide projector, was expected to assess the performance of tasks required to do a specific job. Throughout the developmental stage, the packages were tested with physically able junior high school students at the Industrial Arts Multi-Activity Laboratory at the University. Although the original intent had been to design, develop and test these assessment tools in cooperation with teachers at the Glenrose school, the previously mentioned restrictions prohibited this procedure. As a result, only four of the assessment packages--Basic Typing, Computer Operation, Measurement, and Small Engines Assembly--were tested with physically handicapped students. By the time the research project ended, a number of the packages had been modified, and were ready for re-testing (Part III, pp. 90-92).

The Use of the Computer to Promote the Development of Pre-Vocational and Vocational Skills. Although there had been no intention expressed in the proposal to introduce the students at the Glenrose school to the use of computers, two computers were made available for the project--a PET and a Texas Instrument TI-99/4 with a speech synthesizer component. As none of the school staff members were conversant with the operation or use of computers, instruction in computer literacy was given to those who expressed an interest. Four of those teachers went on to learn programming in BASIC, and expressed their intentions of continuing in the field. One of the teachers introduced his students to the operation of the PET, and obtained several commercially produced programs for use in his classroom.

Although several simple instructional programs were developed, it was concluded by the teachers involved that, in order to make adequate use of the computer, either release time must be given for the preparation of materials or it would be necessary to purchase commercially produced software.

Two of the previously mentioned assessment packages, Computer Operation and Computer Use, were tested at the school, and were subsequently modified to compensate for difficulties encountered in the testing procedure. The junior and senior high school students who had the opportunity to work with the PET were very enthusiastic, as they could succeed in its operation. Also, the computer field

seemed to offer a means of overcoming the mobility problems which would be encountered in future employment (Part III, pp. 99-100).

At the same time as the Glenrose research was being conducted, a graduate student was compiling data for her Master's thesis. Her research involved the use of the micro-computer in the instruction of grade one pupils (Butler, 1983).

Career Information

In order to alleviate the problem caused by the lack of student information regarding the employment market, an attempt was made to identify jobs which could be performed by persons with the variety of physical handicaps represented in the student population. A number of job clusters were identified as having the potential for the employment of the physically handicapped. Descriptions of specific jobs within these clusters were obtained, and task analyses were done for each job. It was expected that the student who had tentatively identified a career goal would have the opportunity, by learning about the job requirements, to match his or her abilities to the job specifications and make career plans on that basis. The identification of specific jobs which were of interest to students, and for which their physical limitations would pose no insurmountable barriers, was intended to lead to the institution of a cooperative education system (Part III, pp. 132-134).

General Recommendations and Conclusions

As a result of the findings of the research, a number of recommendations were made. It was suggested that:

> . . . vocational education for the handicapped should not be based upon the conventional craft and technical programs. The variety of handicaps displayed by the school population indicates that no craft or technical position could be adequately performed by persons with the handicaps represented, therefore, a core of competencies should be identified which would capitalize upon the individual student's abilities, rather than upon his or her handicaps. Further investigation of the job-content in the various fields also indicates that the conventional programs require radical revisions, and that these revisions should be reflected in vocational education programs designed specifically for the physically handicapped. (Part I, p. 1)

It was also suggested that a facilitating service be developed to provide ". . . advice, counsel, assistance, and basic information regarding the job market potential, the variety of government agencies' assistance available, and other specialized services" (p. 1). The facilitator would help to ". . . ease the transition of the young person into a mode of life and sets of psychological readjustments through a service not available in conventional education programs" (p. 2).

Several conclusions were reached as the result of the introduction of computer technology. Although there is a limited amount of software designed for the specific strategies needed for working with the physically handicapped, computers can be used advantageously with all

grade levels (p. 2). "Program and strategy development . . . requires specialized educational skills, and it should not be expected that the teacher can attain the required levels of competency within the usual teaching schedule" (p. 2). Thus, additional education, as well as more preparation time, would be required by teachers if computers are to be used to advantage in teaching the physically disabled children in the school (pp. 2 and 3).

A Survey of Twenty-Four Physically Disabled Adults in the Edmonton Area

One fact that came to light as a result of the Glenrose School Hospital research was that there had been no follow-up studies of graduates of the school or of the students who had been mainstreamed in the regular schools. In an attempt to determine if these people were experiencing difficulty in finding employment, the writer undertook to trace and interview as many as possible. Although 24 persons were subsequently interviewed, only 17 of them had attended the Glenrose school.

During the months of May and June, 1980, the names, addresses and telephone numbers of 24 physically disabled adults between the ages of 18 and 23 years were obtained--from Glenrose School Hospital and the Edmonton Separate School records of recent graduates, from the office of Edmonton Social Services for the Disabled, and from some of

the subjects interviewed.

The subjects had handicaps ranging from moderately limiting to severely limiting, with the majority (21 subjects) in the latter category. Eleven were victims of Cerebral Palsy which resulted from either birth trauma or from disease contracted in infancy. One of the 11 had only moderately limiting handicaps, but, because of the mild spasticity which she experience, could not continue in her capacity as a laboratory technician. Five of the subjects were accident victims. Two of these had moderately limiting handicaps, two were paraplegics as a result of spinal injuries, and one was a triple amputee. The remaining eight had severely limiting handicaps. Five of these were victims of Multiple Sclerosis, two had handicaps which resulted from trauma caused by the drug thalidomide, and one suffered from a crippling skin disease.

In order that the data received from the subjects would be comparable, each interview was patterned. Questions asked were in three categories: Education, Transportation, and Employment. For the purpose of this study, only the data concerning Education and Employment are included.

Analysis of Data

Analysis of the data regarding the education of the subjects shows that, with a few exceptions, individual education programs were planned with very little regard for vocational preparation.

Schooling. All except four of the subjects had completed Grade 12. Two of these were expecting to graduate in June, 1980--one was completing a matriculation program and the other was completing a diploma program with a business education orientation. Of the other two who had not completed Grade 12, one had previously attended opportunity classes in elementary and junior high school, and the other had completed Grade 10 by taking correspondence school courses.

Post-Secondary Education. At the time of the survey, three of the subjects were enrolled in post-secondary courses, all at the University of Alberta. Of the three, one was completing the first year in a General Arts program, and the other two were completing the first year in Special Education. All three had severely limiting handicaps, and were experiencing difficulties because of the inaccessibility of some areas at the University. Another of the subjects had previously completed a year in the General Arts program at the University of Alberta, but because of the numerous barriers which he encountered, he decided to discontinue his studies. The subject with the most severely limiting handicaps had taken a variety of courses from Athabasca University and from the University of Alberta, Department of Extension. Prior to his accident, the triple amputee had completed a course in Commercial Cooking at the Northern Alberta Institute of Technology. Another subject, a cerebral palsy victim, had completed a Radio and

Television Arts program at the same institution. Several of the students had taken general interest courses at Grant MacEwan Community College and at the Alberta Vocational Center. The laboratory technician mentioned earlier had received her technical education at Lambton College in Ontario.

Employment. The most startling evidence that came to light as a result of the survey was that 17, or 70.8 percent, of the subjects had never had full-time employment at any time in their lives, and that six subjects (25%) of the group surveyed had never been employed in any capacity. (The 25% figure includes the two high school students who were expecting to complete Grade 12 in June, 1980.)

Eighteen (75%) of the subjects were unemployed when interviewed. Three of the six who were employed worked in temporary jobs on a part-time basis. Of the three who worked full-time, two were employed by an agency which provided services for the physically disabled, and the other was employed as sports editor for a newspaper published by and for the physically disabled.

One of the part-time workers was employed as a field worker on a project financed by the federal government Local Employment Assistance Program, one was self-employed as a flower arranger, and the other was employed in a temporary position as a repairs dispatcher for Alberta Government Telephones.

The types of temporary and/or part-time jobs

previously held by the subjects, with the exception of the accident victims, were either of a "make-work" nature and financed by federal government grants, or of such unrewarding work as selling raffle tickets on a commission basis or doing telephone soliciting.

Fourteen of the subjects had never applied for jobs. The reason given in the majority of cases was that there was no use in applying as employers do not want disabled employees. Ten of the persons interviewed stated that they had been refused employment. Some comments made by the subjects regarding the reasons employers gave for refusing employment are quoted below:

> "Some employers don't give you a chance. They don't understand your disability. They think you have mental problems, too. They think you are not too bright."
>
> "They say--don't call us; we'll call you--when they find out my arm is paralyzed."
>
> "As soon as they see there is a handicap they shy away."
>
> "Employers give me the run-around when they see I am disabled."
>
> "Most employers take a look at me and think I am retarded."
>
> "I have been refused many times. They just don't hire handicapped people. I get nowhere with applications."

Preparation for Employment. The subjects were asked if they felt that their schooling and/or other education had adequately prepared them for employment. Some of the responses to the question are quoted below:

"I guess my education was adequate but I still can't get a job."

"I'm working in a totally different medium from what I was educated for."

"I feel that extra course work would be necessary."

"Education was too watered down. Teachers were too lenient. High-level courses were not offered."

"The high school English program is not adequate for university entrants."

"There was no life-skills training. I had to learn to cope on my own with people/life/work. The school environment was too sheltered. I had no real responsibilities to myself or to others. Most of the courses were not adequate."

"I had no vocational training."

"The courses were not suitable, as they required fine motor control which I do not have."

"I didn't get any preparation for the kind of work I wanted."

"School was very sheltered."

"My schooling resulted in my not getting jobs."

In general, the subjects who had become disabled because of accident or illness subsequent to their schooling and/or post-secondary education were more positive with regard to being able to get jobs than those who had been disabled since birth or in early childhood. Those who had been disabled since birth or early childhood, although having apparently developed patterns of dependent behavior, all expressed the same desire--to become economically independent through employment.

Generalizations

Although the number in the sample was relatively small in comparison with total number of physically disabled adults in the Edmonton area, the analysis of the data obtained during the interviews with the 24 physically disabled 18 to 24 year old subjects led the writer to make the following generalizations:

1. School programs are not designed to encourage the development of independent thought or action nor the development of vocational competencies in individuals who have been severely physically disabled from birth or from early childhood.
2. The difficulties presented by physical barriers limits or prevents the access of severely physically disabled adults to post-secondary education.
3. The majority of severely physically disabled adults expect to remain economically dependent because of the inability to obtain full-time employment.
4. Subjects who had become disabled as adults want to have access to vocation-oriented education in order to reduce the barriers to employment.
5. Subjects who had become disabled as adults were more confident of their ability to become economically independent than were subjects who had been disabled from birth or early childhood.
6. The types of work at which the severely physically disabled can expect to be employed are in "make-work"

projects sponsored by governments, in telephone soliciting, in ticket sales, or in organizations operated to provide services to the physically disabled.

7. Employers are reluctant to hire physically disabled persons.
8. Physically disabled adults expect to face discrimination in the employment market.

The Raising of Funds to Establish a Vocational Training and Employment Organization for the Adult Physically Disabled

When it became evident that funds would not be available to continue the Glenrose School research project, the decision was made to continue efforts to educate the physically disabled for employment, but, instead of working with school children, to work with the adult disabled. It was expected that the demonstration of success in this endeavour would encourage school authorities to give more consideration in the future to the rights of physically disabled students to develop the competencies necessary to improve their competitive positions in the employment market. For this purpose, plans were made to raise funds for the establishment of a combined vocational training school and employment organization for physically disabled adults in the Edmonton area.

It was anticipated that the Vocational Rehabilitation Branch of Alberta Social Services and Community Health

and the Federal Ministry of Manpower and Immigration, Local Employment Assistance Program (LEAP) would provide the necessary funds, and so a proposal was written. During the preparation of the proposal, contact persons from both agencies gave advice and assistance. As the provincial government was being asked to provide capital funds and the federal government to supply operating funds for the same project, it was decided that one proposal, meeting the requirements of both agencies, would be submitted. This procedure allowed both agencies to examine the merits of the overall plan and eliminated the need for duplicate procedures.

During the writing of the proposal, it was discovered that funds would be supplied only to a corporate body. A lawyer advised that, as the proposal was for funds for a non-profit institution, the best course of action would be to incorporate in compliance with the terms of the Societies Act of Alberta, and that in order to incorporate, it would be necessary to recruit persons who would serve on a Board of Directors. It was deemed to be essential to the success of the project that a group of individuals with established standings in the community and with business and administrative acumen be responsible for the setting of policy for the fledgling organization (Note 4).

Incorporation of the P.H.O.E.N.I.X. Foundation

An application for incorporation under the provisions of the Societies Act of Alberta was prepared and submitted to the Office of the Registrar of Companies, Province of Alberta, in January of 1981. This document cited the following objectives of the Society (Note 5):

(a) To encourage, foster, and develop handicapped people as productive members of society.

(b) To foster, promote and develop the abilities, training, skills, and education of handicapped people.

(c) To foster, promote, conduct, encourage, develop and finance research, training and assessment in respect to handicapped people.

(d) To promote, foster, encourage and develop the employment of handicapped people.

(e) To promote and encourage a wider knowledge and understanding of handicapped people.

(f) To employ experts and establish and maintain offices, agencies and institutions involved in the advancement of handicapped people.

(g) To solicit or raise funds to use, apply and devote all or part thereof and income therefrom for charitable purposes for the handicapped.

(h) To operate exclusively as a charitable organization, to administer and employ its property, assets and rights for the sole purpose of aiding and helping in the education, training, employment and development of the handicapped.

(i) To do all such things as are conducive to the attainment of its objectives.

A Certificate of Incorporation was issued by Alberta Consumer and Corporate Affairs on February 11, 1981.

At that time, the members of the Board of Directors of the Foundation were actively engaged in attempting to raise funds through donations from organizations such as the Lee, Winspear and Muttart Foundations and the Royal Canadian Legion. The lawyer advised that the granting of such funds was dependent upon whether or not the P.H.O.E.N.I.X. Foundation was licensed to operate as a charitable organization. The requirements for such a license were subsequently met, and, some time later, a registration number was issued by the federal government so that donors to the Foundation could take advantage of Income Tax exemptions.

The Proposal

In May of 1981, copies of the final draft of the proposal for funds were submitted to the Federal Government Local Employment Assistance Program representative and the representative of the Rehabilitation Branch of Alberta Social Services. The request was for the amount of $335,000 in operating (and some capital) funds from LEAP, and for $425,000 in capital funds from Alberta Social Services. The objective of the project and the proposed activities, possible candidates, and estimated costs and expenditures were described in detail. At that time it was expected that both donations and business generated by

operations would bring in an additional $200,000.

The belief in the goals of the proposed operation was based on the premise that there are no "disabled" persons, only persons with varying degrees of physical ability, and that these persons may achieve their potential if given the opportunity to do so through the establishment of suitable training and employment programs. It was proposed that the operation of the P.H.O.E.N.I.X. Foundation would encompass the following four major activities:

1. The establishment of a viable business enterprise to satisfy the needs for training, for employment opportunities, for equipment modifications, and for continuing research.

2. The provision of an environment in which prospective employers could observe the physically handicapped personnel successfully performing productive functions. It was expected that these observations would lead to offers of jobs in industry for handicapped personnel, and to the formation of subcontract arrangements with the P.H.O.E.N.I.X. Foundation.

3. The provision of a controlled working environment for those persons whose physical handicaps are such that their employment in the private or public sectors is not feasible.

4. The provision of work experiences which would enable severely handicapped persons to attain the benefits of continuing economic independence, of pension plans, of interaction with members of a productive society, of participation in activities which would lead to self-fulfillment and of a quality of life which is the accepted norm in our society and which would help overcome currently existing barriers. (Note 6)

The unique aspects of this proposal involved ". . . the

design and implementation of training programs, the adaptation of production processes, and the long-term commitment by members of the Board of Directors to provide training for employees in managerial and executive skills to prepare them for employment within the enterprise" (Note 6). The ultimate goal was to have a combined training school and business enterprise which would be staffed, as much as possible, by the physically disabled.

The proposed training program was to be in five basic training areas: computer technology, printing, micrographic processing, small electrical appliance repair, and small engine repair. The program activities were expected to be mutually reinforcing by providing prospective employees with the necessary adaptability to meet the physical demands of various occupations in industry. The five areas enumerated represented a nucleus of activities which would lend themselves to the functions of assessing and evaluating the potential abilities of handicapped people. Also, the economic growth in the province at that time was such that, by capitalizing on the needs of the public and private sectors, the placement of prospective trainees would be facilitated.

Each of the activities was expected to provide basic training which would permit the reassignment of persons within the organization in keeping with their abilities to maintain productivity and quality. The intention was that procedures and equipment would be modified to facilitate the

attainment of this objective.

Another anticipated outcome of the operation was that information gained from assessing the abilities of handicapped personnel would identify key competencies which could be considered in the design of curricula for pre-vocational and vocational education programs for school systems.

In order to convince the funding agents of the feasibility of attaining the objective outlined in the proposal, the pilot study was conducted with five severely physically disabled volunteers, who were trained to operate and program computers.

Chapter Summary

Research at the Glenrose School Hospital emphasized the need for the design and development of educational programs which would assess students' abilities and identify pre-vocational and vocational competencies, and, by individualizing educational programs from Kindergarten through Grade 12, provide graduate students with the means to break down barriers to employment. A lack of sufficient funds curtailed the activities planned for the first phase of the proposed three-phase, three-year project, and caused its termination after the first year. However, it was possible to begin a number of the activities planned, even though the scope of the research was narrowed considerably.

An assessment records system was designed to reduce the bulk of the information in existing school records to an easily accessible minimum, and to provide data from each member of the students' multi-disciplinary teams. The recording system consisted of Student Profile Charts for recording medical, physical, educational, psychological, social, speech, hearing and physiotherapy assessment data, with a coding scheme to maintain confidentiality.

The following methods of identifying and assessing the physical aptitudes, limitations and interests of students were examined:

1. The use of toys and games with primary grade students;
2. The use of the computer with grade one and junior/senior high school students;
3. The suitability of commercially produced work sample systems; and
4. The use of assessment packages produced specifically for the physically handicapped.

As a preliminary move in the establishment of a cooperative education system, job descriptions and task analyses were made for some of the types of employment in which physically disabled persons could be successful.

The research findings indicated that the regular school programs were inadequate in providing the physically disabled students with vocational competencies. It was recommended that a core of competencies be identified and individual programs be designed to develop these

competencies and to capitalize on student abilities, rather than on handicaps. It was also recommended that a facilitating function be defined--for the coordination of services required for the transition of the individual from student to employee. It was also recommended that computers could be used advantageously in the education of physically disabled students, and that teachers should be granted the time necessary for education and for curriculum design and development.

Before the termination of the Glenrose research project, a survey of 24 physically disabled adults was conducted. Most of those surveyed had severely limiting handicaps. The survey, in the form of patterned interviews, resulted in the gathering of data on the topics of Education, Transportation and Employment. Although the subjects in the sample were not randomly selected, and although the sample was small in relation to the actual numbers of physically disabled persons in the Edmonton area, the responses from each were consistent. As a result of these responses, the writer made a number of generalizations. First, school programs for the physically disabled are not designed to encourage the development of independent thought and action or the development of vocational competencies. Second, post-secondary institutions in the area are not designed for access by physically disabled persons. Third, physically disabled persons want vocation-oriented education in order to reduce the barriers to employment. Fourth, the majority

of physically disabled adults expect to remain economically dependent, although those who became disabled as adults are more confident of their ability to find employment than those who were physically disabled from birth or from early childhood. Fifth, employers are reluctant to hire physically disabled persons, and these persons expect to face discrimination in the search for employment.

Both the failure to obtain continued support for the Glenrose research and the results of the survey influenced the decision to apply to the federal and provincial governments for funds to establish a vocational training school combined with an organization which would provide a controlled work environment for physically disabled adults. It was proposed that training and, subsequently, employment would be provided in the areas of computer technology, printing, micrographic processing, small electrical appliance repair, and small engine repair. To prove the objectives cited in the proposal to be possible, a pilot study in the training of severely physically disabled persons was conducted.

CHAPTER IV

THE PHOENIX VOCATIONAL TRAINING AND EMPLOYMENT PROJECT FOR PHYSICALLY HANDICAPPED ADULTS - A PILOT STUDY

Introduction

The purpose of the pilot study--the Phoenix Vocational Training and Employment Project--was to provide evidence of the feasibility of training adults with severely limiting handicaps for employment in the field of computer technology, and to demonstrate to employers that physically handicapped individuals can be competitive with physically able employees. To this end, plans were set in motion to educate a group of volunteers in computer literacy and in the operation and programming of computers, and to orient prospective employers.

The Setting

The Industrial Arts Laboratory, maintained by the Faculty of Education, Department of Industrial and Vocational Education at the University of Alberta, was chosen as the site for the research, although initial instruction for one of the participants was given at the Aberhart Memorial Hospital.

One of the entrances to the laboratory (a one-storey

structure) was equipped with a ramp which could be closely approached by the DATS buses used for transportation by the participants. Space for the computers and furniture used in the research was made available in the lecture room portion of the laboratory complex. Although the area was very crowded, it was adequate.

Equipment

The electronic equipment used in the pilot study was purchased specifically for the project with monies supplied by the University Alma Mater Fund and the South Edmonton Lioness' Club, along with matching grants from the Government of Alberta, Advanced Education and Manpower Ministry.

The equipment used consisted of APPLE II Plus computers and 48K Memory and disk drives (DISK II w/c and DOS 3.3), Panasonic Video Monitors, A2M0029 Graphic Tablets, an Apple Professional Light Pen, a Voice Synthesizer and a Voice Entry terminal. Outside of minor changes in furniture arrangements and special adaptations to two keyboards and to the Light Pen, no modifications to the equipment were necessary.

The Training Program

Instruction began in April of 1980. The instruction team consisted of Graduate Student Assistants, one of whom acted as overseer for the project, and several undergraduate

students who instructed the participants. The composition of the team changed periodically as necessitated by changes in individuals' academic programs and responsibilities to the university.

The course of instruction was designed in three phases, the first involving orientation to the field of microcomputers, the second involving hands-on experience in the operation of computers, and the third involving elementary programming. The participants were given individual instruction by the team members, and each worked at his or her own pace.

The training program was conducted during two academic years, including spring and summer sessions. It concluded on April 30, 1982, at which time the P.H.O.E.N.I.X. Training and Development Center was established as an institution to provide vocational education and employment placement for severely physically handicapped adults.

Case Studies

The pilot project began in April, 1980, with three participants, designated in this thesis as LB, MJ and EC. All three had extremely limiting physical disabilities. LB had had three limbs amputated as a result of an accident which had occurred two years earlier; MJ had cerebral palsy as a result of anoxia at birth; and EC had cerebral palsy as a result of encephalitis contracted in infancy. After several months, the group was joined by two other participants:

CD who was disabled by cerebral palsy which resulted from anoxia at birth; and MG who was a quadriplegic as the result of a recent automobile accident.

The following case studies contain information gained by the writer from unstructured interviews conducted with the participants prior to the commencement of the pilot study, from unstructured interviews, conversations and observations during the study and after its conclusion, from discussions with other members of the research team, and from a report written by one of the team members at the conclusion of the research (Note 7).

The case studies are arranged in similar formats, each with a brief description of the physical state, formal education, work experience and/or community service, the fields of special interest of each of the participants, and a report on the progress and achievements of each, both during and at the conclusion of the project. Information regarding the causes of their physical disabilities was supplied by the participants. Statements regarding their physical limitations are based on observations made by the writer.

Data concerning the work experience of the participants are included to give evidence of the need for their vocational training, or retraining, and for a means of reducing the barriers to their employment and subsequent economic independence. In contrast, the histories of community services performed by each gives evidence of the acceptability to the community of their unremunerated work.

Hopes and expectations for the future are expressed as the special interests of each of the participants. Statements regarding attitudes are based on their statements, and on the observations and opinions of the writer.

Only one of the participants had had any previous experience in the use of computers, and none had had any formal education in this field. None of them were employed at the time the pilot study began, although four of the five did work to some extent during the study. All five expressed the desire to become economically independent.

Case Study - MJ

Physical State. MJ is a 34-year-old male, the victim of Cerebral Palsy which resulted from brain damage at birth. He is not spastic, but has extremely limited motor ability. He is able to use his hands to a limited extent in such activities as writing and eating, and in operating the electronically powered wheelchair to which he is confined. He must depend on help from others for personal care, although he lives alone in an apartment specially designed for the use of physically disabled persons. He has no speech, vision or auditory impairment.

Education. Because of his physical condition, MJ was unable to attend regular schools. When he was six years old, he was enrolled in classes at the Cerebral Palsy Clinic in Edmonton. He attended these classes for the first three grades and, at the same time, received extra instruction

from his mother. During the time that he was in grades four, five and six, he continued with classes at the Clinic and, also, in his home under the tutelage of a homebound teacher supplied by the Edmonton Public School Board. Three months of his sixth grade term were spent in the Red Cross Hospital in Calgary.

When he was in junior high school, MJ was enrolled with the Correspondence School Branch of Alberta Education. During that time, he still had assistance from a homebound teacher. At the high school level, he completed only two subjects, Bookkeeping 10 and Business Fundamentals 10. He took both of these courses by correspondence. By the time he had completed these courses he was 21 years old.

From his 21st year to the time of his involvement in the Pilot Project, MJ has had no other formal education, although it is obvious he has gained knowledge through experience, as he is a very articulate young man. He stated that there was no use continuing with school, as there was no hope of getting work (Note 8).

Work Experience. MJ has had very little remunerative employment during his adult years, although he has spent many hours doing volunteer work. His first job, obtained in 1974 when he was 27 years old, was as the coordinator of a project to provide transportation services for the disabled. The project was funded by a grant from the federal government Local Initiatives Program (LIP). Unfortunately, MJ's job ceased when the six-month period of the operating grant

expired.

In 1975, the Disabled Adults Transportation Service (DATS) was begun by the City of Edmonton Transit Department. MJ worked as a Complaints Officer for the system. He worked at his home, taking complaints by phone and contacting DATS personnel to resolve problems as they arose. His employment in this position terminated after two years, as there were not enough complaints to warrant the continuation of his services.

Throughout the years since 1977, MJ has had a number of jobs, none of which were very profitable. Many of the jobs were in telephone soliciting. Leads for these jobs were obtained from personnel at the Alberta Social Services for the Disabled office, but MJ found one on his own through a newspaper advertisement. This job was to sell tickets for the Edmonton Driller's Soccer Club, with telephone sales made mainly to businesses. Although the job ended with the soccer season, MJ found it to be more enjoyable and remunerative than the other telephone soliciting jobs.

On one of the soliciting jobs, MJ earned only forty dollars in commissions for two months of work. On another, he gave up after three days of phoning had resulted in not one sale.

MJ found it very discouraging that these types of jobs were all that were available to him. Even the process of applying for a job was almost impossible for him, as he found that many businesses are not accessible to wheelchair users.

For a time in 1980, MJ was able to sell tickets on a commission basis in shopping malls in Edmonton. Later, he was employed by the Spokesman, a newspaper published by and for physically disabled persons. He found this job both interesting and profitable. However, the work was periodic, so could not supply an income sufficient to ensure his financial independence.

In the summer of 1981, MJ applied for a job with Alberta Culture. The successful applicant was to survey the Archives Building to determine which areas of the building could be made accessible to wheelchair users. MJ was interviewed, but failed to get the job. Another physically disabled person, who was more mobile than MJ, got the job instead. MJ was disappointed, but stated that the decision made to hire the other applicant was a fair one, as the other man was more qualified than he (Note 8).

In 1981, MJ also received a grant from the provincial government through the Summer Temporary Employment Program (STEP). For this grant, he was expected to conduct a visitor survey at the Strathcona Science Center. In order to get to work, it was necessary for him to take a DATS van to the Rundle Park A.C.T. Center at the city boundary and then to complete the trip by wheelchair--a half-hour wheelchair drive. The grant money ran out before MJ had time to finish compiling statistics from the survey questionnaires, so the project was never completed.

Community Service. MJ was a member of the Board of Directors of DATS Advisory Council for two years, and then served as Chairman of the Operations Standing Committee of the Council. He also served for four years on the Board of Directors of the Handicapped Housing Society of Edmonton, and three years on the Board of Directors of Edmonton Social Services for the Disabled. In addition to the services listed above, MJ has devoted many hours to voluntary services, mainly in the selling of tickets for charitable agencies.

Special Interests. For some time, MJ has been interested in the travel agency business. He would like to be able to arrange tours for physically disabled people, but does not have the financial resources necessary to establish this type of business. He is also interested in doing public relations work.

MJ also enjoys public speaking, and is very competent in this area. He has competed in public speaking contests sponsored by the Paralympic Sports Association, and has won several contests, including the National Championship.

Since his participation in the pilot study, MJ has developed a keen interest in computers. He stated that his involvement with the project was the best thing that ever happened to him (Note 8). Although he sometimes appears to be frustrated because of his physical limitations, he feels that the type of training he has received offers some hope for himself and for other disabled persons, as computers, with

controls modified to compensate for physical limitations, may open the door to employment opportunities.

Progress Summary. MJ's progress since the beginning of the pilot project is evidenced by the graphically perfect images he has produced. Since he was first introduced to computer graphics, he has appeared to be highly motivated. He has produced finely detailed images, and has completed a number of graphics projects.

It was not necessary to modify equipment or to utilize special aids for MJ. Although his handicaps caused him to work very slowly, he was able to manipulate the computer controls with little difficulty.

There has been a noticeable change in MJ's attitude toward working with the computer. At the beginning of the project, he spent most of his time playing computer games, but, later on, he began to stay late after classes to finish projects.

Case Study - EC

Physical State. EC, a 23-year-old female, is a victim of cerebral palsy which resulted from encephalitis contracted when she was nine months old. She has to depend on others for personal care, although she has some use of her right hand and arm. Her speech is somewhat slow and halting, but she is able to communicate orally. She has no visual or auditory impairment. For locomotion, EC depends on an electrically powered wheelchair which is equipped with attachments to aid her in maintaining erect posture.

Education. EC attended the Cerebral Palsy Clinic in Edmonton for the first few grades in elementary school, and then attended Glenrose School Hospital, where she continued until she completed her schooling and earned a diploma. When she was in Grade Ten, she required surgery, and spent six months as a patient in Glenrose Hospital. During that time, she was able to continue with most of the courses in which she was enrolled, but had to drop two because of her physical condition. As a result of this interruption, she required four years to complete high school. The only vocational education courses which she took were Typing 10 and Work Experience 20 and 30. In the latter courses, she worked as an aide to teachers of Grades One and Two at the Glenrose School.

Following graduation in 1978, EC enrolled in a General Arts and Science program at Grant MacEwan Community College. Transportation and accessibility problems caused her to drop out of this program after completing the first year.

Work Experience/Community Service. EC, who was a resident of a nursing home, has never had a paying job, but has spent the years since she stopped attending college in doing volunteer work. She helped her nursing home staff by answering the phone. She also worked for two and a half years as a volunteer teacher aide at the Glenrose School, where she helped teachers in ten different classes, working with children in kindergarten classes, and in Grades One to

Four.

In her work with the children at the school, EC performed a variety of functions. She worked with students on a one-to-one basis, giving remedial instruction in such subjects as reading and mathematics. Her duties included running errands for teachers, reading stories to the children, correcting assignments, and supervising when the teacher was away from the classroom.

Throughout the time that she was a participant in the pilot study, EC continued working as an aide at the Glenrose School.

Special Interests. Even though she was not paid, EC got a lot of satisfaction from her work with children. She plans to use her computer programming ability in her work at the school. She stated that the training she has gotten in programming will, perhaps, lead to greater recognition of her contribution and, consequently, to payment for her work (Note 8).

Progress Summary. EC's first major achievement was the design and development of a program for the teaching of basic French to Grade Two students. The program, designed to assess comprehension, included both questions and very colorful graphics. Following the completion of this program, EC mastered the use of the APPLE PILOT system, a set of programs which involve the use of a computer language entirely new to her, and which are intended for use in the writing of educational software. EC designed a program which utilized

all of the variables for this system, including text, high resolution color graphics, and sound. It is feasible to expect that the software which EC is capable of producing will be marketable.

Toward the end of the pilot study, EC's efficiency was enhanced by the use of peripheral equipment. To compensate for the weaknesses in her hand and arm, keyboard adaptations were made, and a Voice Entry terminal installed.

EC appeared to be highly enthusiastic about her work with the computer and its potential for increasing her value as a teacher's aide.

Case Study - CD

Physical State. CD, a 24-year-old male, has cerebral palsy as a result of an injury sustained at birth. This condition affects his speech, locomotion and fine motor skills. EC can speak, but experiences a great deal of difficulty in making himself understood, so usually uses a small, battery operated, hand-held typewriter to communicate. Walking is difficult for him, so he uses a manually operated wheelchair most of the time. He also uses a motorized, three-wheeled, scooter-type of vehicle. He is unable to do any fine handwork, such as writing or drafting, but has become proficient in the use of the typewriter, and is demonstrating considerable ability in the operation and programming of the computer.

CD's condition has been static throughout most of his

life, but in recent years, it is showing some improvement. He says that this may be due to the fact that, since leaving Glenrose (School Hospital), he has had to become more independent, since there is not always someone around to help (Note 8).

Education. CD took all of his schooling in Glenrose School Hospital, and graduated in 1977. After graduation, he spent a year and a half in the Alberta College business education program. His program at the college included two computer courses in which he used the Fortran language. For one of these courses, he earned an honors grade.

While he was still in high school, CD took two correspondence courses in Accounting. He finally had to give this up, as it was too time-consuming to work with the variety of different forms while using a typewriter.

A few years ago, CD bought a Radio Shack TRS-80 computer. He became quite skilled in the use of this computer, and really enjoyed working with it.

Work Experience. While he was attending Alberta College, CD got a job with QCTV. His function was to type television schedules, work which he did in his home. Transporting the typed schedules to the station proved to be too difficult, so the job lasted only three months. After a year-long period of unemployment, CD obtained clerical work with Alberta Culture. He believed that the job represented tokenism--a show of equality of opportunity (Note 8). He had very little meaningful work to do. Occasionally, he

would be given a typing assignment or some materials to duplicate, but he spent most of his time on the job reading. That job lasted only six months. He did gain, however, as he studied the APL programming language, and had the opportunity to experiment with a computer.

In the spring of 1979, CD began a six-month job in a department of Alberta Environment. The situation on this job, he said, was entirely different. As he was given plenty of work to do, he was made to feel useful. His responsibilities included writing letters, preparing out-going mail, filing, duplicating, and operating micro-filming equipment.

CD enjoyed his work on that job, and felt that he was accepted by the other members of the staff, with whom he socialized during coffee and lunch breaks. After the six-month probationary period, the job was extended for another six months, and then extended again, so that CD worked for a total of one and a half years. Toward the end of the third six-month period, CD was informed by a representative of the Personnel Department of the Government of Alberta that he was to be released at the end of the period. The reason given was that his work was not satisfactory, but CD felt that he was released because of his speech handicap.

CD's next employment was with the Alberta Committee of Consumer Groups for Disabled Persons, where he was employed as a researcher. His duties included writing reports and conducting surveys for the Committee. His performance on this job led to another as Coordinator for the Regional Action Group of Edmonton, a job which he accepted during

the course of the study. CD's employer allowed him to take time off during working hours so that he could continue to participate in the pilot study.

Community Service. While he was enrolled at Glenrose School Hospital, CD served for several years on the Students' Union Council. He is a member of the Executive of the Paralympic Sports Association and of the Cerebral Palsy Association. His work with the Regional Action Group led to his appointment to the DATS Advisory Council.

Special Interests. CD would like to work in a type of employment which would permit him to perform a variety of functions, as opposed to one which would require the repetitive performance of tasks. He enjoys working with a computer, and would like to become proficient as a programmer.

Progress Summary. CD joined the pilot group several months after its initiation. Even so, his accomplishments were impressive. He completed the BASIC computer language STEP BY STEP course--a self-teaching course in programming delivered via the APPLE computer. He developed a program to convert metric measurements to imperial, a game program, and a file-handling program, all of which were very well designed. To help overcome his speech handicap, CD learned to use a voice synthesizer.

CD was very enthusiastic about his participation in the pilot study. His positive attitude is evident in his response (Note 8) to the writer's question regarding his

reaction to the project:

> Before I answer this, I'll back up five years. I finished all my schooling--and then what? Of course, I wanted a job, so was sent from one organization to the next. While I don't think I should mention any names, they [the organizations] were all disgraces. How would you like to spend all day counting out one hundred nuts and putting them in jars, or putting colored blocks into the right boxes? I didn't enjoy that, so I left after three days. I then entered another program which was a bit better, but still was not what I was looking for. It was designed to help people plan how to do things. I guess I must be strange or something, because I don't like to plan my days down to each detail, and then write down each detail, and then be expected to follow it [the plan]. I know what I have to do and when, so I didn't see much point in going to great lengths writing out each step in my daily life. I think I stayed there six weeks.
>
> From there I went to Canada Manpower, Special Placement, but they weren't too interested in me. In the end, I did find the job with the provincial government.
>
> The reason for telling all this is to back up my next statement. When I heard about the pilot study, I wasn't interested. I had been through so many programs designed just for the disabled, as far as I was concerned this was just another such program. But, for lack of something better to do, I went. I'm sure glad I did. I think maybe that this is the first program . . . that is on the right track. I think [the project director] is a super guy. He seems to go all out for us. I wish there were more people like him. I have found that most people want to stress our disabilities, rather than our abilities, but I found that in the project, they want to stress our abilities. They seem to be able to work around difficulties that sometimes surface . . . . People like . . . [graduate and undergraduate students who assist with the training] are also a great help. Without them, I know I wouldn't have learned as much as I have. I only hope they can soon expand the project, and find a better location.

Case Study - LB

Physical State. LB, a 33-year-old male, is a triple amputee. As a result of a farm accident involving electricity, he lost three limbs. One arm was amputated at the shoulder socket. The other, amputated below the shoulder, has been fitted with a mechanical prosthesis. The left leg, amputated below the knee, is also fitted with a prosthesis. Some ribs on his left side were also removed. In spite of the losses he has suffered, LB is amazingly active. He walks with no noticeable difficulty, although he spends much of his time in a wheelchair which he propels with his foot. He is able to perform a variety of manipulative activities with his mechanical prosthesis.

Education. LB took all his schooling in a small town near Edmonton, where he completed Grade 12. He completed a two-year commercial cooking course at the Northern Alberta Institute of Technology, but, because of his accident, never had the opportunity to work at his trade.

Work Experience. LB's working days started early in his life. When he was about ten years old, he began delivering milk before school hours, a job which necessitated his getting up at four o'clock every morning. He continued to work at that job until he finished high school. After his graduation and prior to his enrollment at NAIT, he worked on a farm.

Since his recovery from the succession of operations which followed his accident, LB has held a variety of

short-term jobs. The first of these was on a summer project for the Association of Commercial Travellers, with funds supplied by the federal government. LB worked on that project with several other physically disabled persons. The group was responsible for arranging recreational activities for residents of nursing homes in Edmonton.

LB has had several jobs selling raffle tickets in shopping malls, and has done telephone soliciting. He also worked for a time as a dispatcher for an Edmonton company in the business of coordinating the services of tradesmen. His payment for that job was on a wage-plus-commission basis.

The work which LB enjoyed most was selling. He was employed on an occasional basis by a poet--a paraplegic--to sell books of poetry in shopping malls. The work gave him opportunities to meet and mingle with the public. The experience helped him to cope with reactions to his disabilities and, also, helped members of the public to deal with him as an individual rather than as a "disabled person."

In 1981, LB was employed for a short time as an extra in an award-winning National Film Board production. He enjoyed the experience very much, but realized that it was probably a once-in-a-lifetime opportunity.

Since his accident, LB has had only part-time jobs, with insufficient income to ensure economic independence; but, in his words, "any income is better than no income at all" (Note 8). His cheerful outlook and friendly attitude seem to be well suited for work in an occupation which would bring him into direct contact with the public.

Special Interests. LB, since his involvement with the pilot study, has developed an interest in computers, and plans to purchase an APPLE II Plus as soon as he has the necessary financial resources.

Progress Summary. Because LB was ill for a considerable length of time during the pilot study, he did not progress as rapidly as the other participants. He worked in the area of Accounting, using THE CONTROLLER, a self-training program. The use of a keyboard template allowed him to be more efficient in using his prosthesis or a mouth-held wand for data entry. He designed several simple programs, using the STEP BY STEP program as a guide. Even though his medical problems interrupted his training, LB appears to have the potential for success.

He feels that he is perfectly capable of handling an eight-hour work day in competition with able-bodied persons. He has demonstrated his stamina by working nine-hour shifts on his sales jobs. His determination to regain economic independence is evident in his speech and attitude.

Case Study - MG

Physical State. MG, a 33-year-old female, is a quadriplegic. Her condition resulted from injuries sustained in an automobile accident in 1980. She is paralyzed from the shoulders down; however, she has relatively good use of her arms, and partial control of her hands. She is able to transfer without help to and from her manually operated

wheelchair, and is able to put in an eight-hour work day, independent of any aid for personal care. She drives a van which has been converted to compensate for her physical limitations.

Education. MG completed a high school matriculation program at Mount Royal Collegiate in Saskatoon, Saskatchewan, where she graduated in 1966. She then enrolled in an Arts and Sciences program at the University of Saskatchewan in Saskatoon. After having completed the first year, she transferred to a nursing training program and, in 1969, obtained a Registered Nurse Diploma.

Work Experience. After graduation, MG worked for several years in Saskatchewan and Alberta as a general duty nurse. Her work was in the areas of gynecology, intensive care, medicine, and paediatrics. Later, she served as a Team Leader and as Charge Nurse in a large Edmonton hospital. In 1974, she transferred to another Edmonton hospital, where she held the position of Head Nurse in paediatrics.

In 1979, MG enrolled at the University of Alberta and, subsequently, graduated with Distinction, receiving the degree of Bachelor of Science in Nursing. It was shortly after her graduation that she was injured.

Community Service. MG was instrumental in founding a self-help organization for persons with spinal injuries. She is also involved with other rehabilitation organizations. In June, 1982, she participated in a Rehabilitation Workshop sponsored by the Department of Extension, University of

Alberta. Because of her qualifications as a nurse, she is frequently called upon to give advice to rehabilitation professionals.

Special Interests. MG's first interest is in administration in the health care field, but she expects that her prospects for employment in this capacity are hampered by her handicaps. She anticipates future employment in the tying-in of her computer programming ability with her knowledge of, and experience in, health care.

Progress Summary. MG's preliminary computer training was taken when she was a patient in the Aberhart Memorial Hospital. Before her discharge from the hospital, she had purchased an APPLE II computer so that she could continue working at home. By that time she was quite proficient as a programmer, and this ability led to her first employment since her injury. She entered into a one-year term contract with Alberta Advanced Education and Manpower as a Project Resource Officer. Her function was to design and develop curricula for a Nursing Refresher Distance Delivery program. She produced training modules and examinations for courses administered by Grant MacEwan Community College, Faculty of Nursing, and supervised the work of others employed for the project. At the same time, MG was also writing a module on Rehabilitative Nursing for publication.

Throughout the year of her employment, MG continued to attend the twice-weekly classes at the Industrial Arts Laboratory at the University of Alberta.

Orientation of Prospective Employers

During the period of time when the pilot study was in operation, contacts were made with a number of business executives and/or personnel managers of organizations in the area. Representatives from Hewlett Packard, IBM, Computrex The University of Alberta, Grant MacEwan Community College, and the Edmonton Public and Separate School Boards were invited to visit the laboratory, where they were able to meet and talk to the participants, to observe them at work with the computers, and to assess the quality of the work produced. The social aspect of these visits was important, as it provided a means to identify the participants as individuals with physical handicaps rather than as the "disabled."

Chapter Summary

The Phoenix Vocational Training and Employment Project, a pilot study to demonstrate the feasibility of training adults with severely limiting physical handicaps for employment in the field of computer technology, was conducted over a period of two years, beginning in April of 1980 and concluding in April of 1982. The research consisted of a three-phase training program to educate five volunteer participants in computer literacy and in the operation and programming of computers, and was carried out under the auspices of the Faculty of Education, Department of Industrial and Vocational Education at the University of Alberta in Edmonton.

The equipment used for the project, APPLE II Plus computers with peripheral equipment, was purchased with monies granted from the Alma Mater Fund and by the South Edmonton Lioness' Club, with matching grants from the Government of Alberta, Advanced Education and Manpower Ministry. Very few modifications to the equipment were necessary. Keyboard templates were used by two of the participants. One used a Voice Entry unit, one a Speech Synthesizer, and one a mouth-held wand.

The five volunteers who participated in the project all have multiple physical disabilities. Three have cerebral palsy as a result of birth trauma or trauma during infancy, and two are disabled by injuries sustained during adulthood. Case studies of the three who have been disabled from birth or from early childhood show a pattern of underemployment--of part-time work in such jobs as telephone soliciting, ticket sales, or in "make-work" projects sponsored by government agencies. A similar pattern is evident in the work experience report for the participant who was disabled by an accident which occurred two years before the pilot study began. (The fifth participant was injured after the study had been in progress for several months.) All of the participants had been active in performing community services.

The results of the pilot study gave evidence of the feasibility of training the severely physically handicapped for employment in the field of computer technology. In spite of their handicaps, the participants all demonstrated the ability to manipulate the computer and peripheral

equipment controls, and all were able to grasp the fundamentals of programming. After only a few months of instruction, one of the participants obtained a contract to design and develop training module programs in her field (health care), a project on which she worked while still participating in the pilot study.

In the orientation of prospective employers to the feasibility of employing physically handicapped individuals, progress was made toward the ultimate goal of the pilot study -- the productive employment of the participants.

CHAPTER V

THE P.H.O.E.N.I.X. TRAINING AND DEVELOPMENT CENTER--THE IMPLEMENTATION PHASE

Introduction

A time extension granted by the Faculty of Graduate Studies and Research, University of Alberta, permitted the writer to include a description of the implementation phase of the research, the establishment and operation of the P.H.O.E.N.I.X. Training and Development Center. The pilot study had demonstrated the possibility of educating physically disabled persons for employment in one area--in the operation and programming of computers. The implementation phase continued in this area and also included other high-technology areas. An employer orientation and employment placement service was begun, and the ground work was laid for the establishment of a controlled work environment which is expected to provide employment for those graduates who have handicaps which prohibit their employment in the public or private sectors.

Establishment of the P.H.O.E.N.I.X. Training and Development Center

The Receipt of Funds

A grant of $250,000 in operating and capital funds was approved by the ministry of Employment and Immigration Canada on May 20, 1981. The allocation of this money was to be contingent upon the receipt of capital funds from other sources. In April, 1982, a representative of the Rehabilitation Branch of Alberta Social Services and Community Health delivered a cheque for $225,000 for capital purchases to the P.H.O.E.N.I.X. Foundation office. Following the receipt of this cheque, the federal government grant was released, and the establishment of the P.H.O.E.N.I.X. Training and Development Center was assured.

Of the federal government grant, $30,000 was specified for the purchase of equipment, and the remainder was to be allocated on a monthly basis to cover operating costs. The provincial Social Services and Community Health ministry required that a lien agreement be signed, stating that if the equipment purchased with provincial government monies ceased to be used for the purpose for which it was obtained, the equipment was to be sold, and the proceeds of the sale divided between the government and the P.H.O.E.N.I.X. Foundation in proportion to which each contributed. Capital purchases were made during the period from July 1 to December 31, 1982. Subsequently, an

inventory of the equipment purchased was taken, and the lien agreement duly signed.

During the first year of the operation of the training center, an additional $150,000 in donations from private sector sources was received. Also, an additional $100,000 was granted by the federal government early in 1983 to cover unanticipated operating expenses.

Preparations Made for the Opening of the Training Center

Once the funds were released, active planning to open the Training Center were begun. The lease of 7,000 square feet of space in the Jasper Place Composite High School was negotiated with the Edmonton Public School Board. The $35,000-per-year lease, to extend for a three-year period beginning on July 1, 1982, was for the ground floor area in the south east wing of the school, an area comprised of six classrooms and a small office. Also included in the lease were two large washrooms and a suite of five offices with a reception area.

Prior to the installation of laboratory equipment, it was necessary to have changes made in the electrical wiring system. Also, a number of other alterations to the premises were made to ensure the safety and comfort of physically disabled students and to make all areas accessible to wheelchair users.

By September, 1982, several of the laboratories

were equipped and ready for use, although additional equipment was installed periodically throughout the first year of operation. Also during that time, applicants for enrolment were interviewed.

Operation of the Training Center

Criteria for the Acceptance of Applicants

Policy was established that a student would be accepted for enrolment, not on the basis of any specific disability, but on the basis of having a disability or disabilities which prevented him or her from obtaining steady employment. Those applicants who complied with the following rules of eligibility were considered for enrolment:

1. At least 18 years of age at the time of registration;
2. A resident of Alberta;
3. A Canadian citizen or landed immigrant;
4. Having a physical handicap or handicaps which prevented him/her from obtaining steady employment without additional vocational training;
5. Having no steady employment at the time of registration;
6. Requiring a minimum of attendant care;
7. Being financially able to pay for the costs of transportation;
8. Submitting a medical assessment supplied by a physician; and
9. Complying with the academic and vocational assessment

procedures required prior to acceptance.

Although the criteria for enrolment were established as policy, in practice applicants were accepted on a "first-come, first-served" basis, with four of the five pilot study participants as the first enrollees. The assessment procedures had not, at that time, been clearly defined, so applicants for enrolment were admitted on the basis of data obtained from interviews, from academic records, and in accordance with their preferences in training programs.

A Change in Direction

The plans, originally, had been to train students in the areas of computer technology, printing, micrographic processing, electrical appliance repair and small motor repair. These plans were subsequently altered to accommodate changes in economic conditions, in electronics and computer technology, in the capabilities of students, and, also, to provide a broader range of services in the areas of counselling and curriculum.

With the downswing in economic activity in the country and in the province, changes in the employment market became evident. At the time, the micrographic processing industry was showing signs of giving way to new processes in computer technology, and the field was rapidly opening up for the employment of personnel trained in the operation of computers. The results of the operation of Phoenix Pilot Project had clearly demonstrated the

feasibility of training physically handicapped persons in this area. Consequently, the plan to train technicians in the operation of micrographic processing equipment was abandoned and, instead, laboratories were equipped with the latest generation of word processors, drafting and accounting computers, a laser printer, and the facilities to accommodate the interaction of processes among the various types of equipment. There was also a change made in the small motor and electrical appliances repair area.

The repair of the small motors in household appliances was not feasible because the weight and size of the appliances made them difficult for physically disabled students to handle. Although training in the repair of small electrical appliances was retained as an introductory course and for students who were interested in gaining the skills involved but were not prepared to acquire the educational skills necessary for employment in other areas, the emphasis shifted to basic electronics training. The new goal was to train technicians in the repair of computers and other electronic equipment.

The Assessment Process

Applications for enrolment were received either from individuals or representatives of institutions which act on behalf of physically handicapped persons. Those who applied were asked to supply data concerning previous education and vocational training, employment history and health.

Following the submission of these data, candidates were interviewed and a decision was made on whether or not to admit the individual. Those who were not admitted were referred to other agencies such as the Alberta Vocational Center or the Alberta Career Center.

The assessment of applicants by interview proved to be unsatisfactory, so a psychologist was engaged to develop procedures for assessing the academic and vocational abilities of applicants. In this assessment process, successful applicants are scheduled to undergo a series of core tests, the results of which are the basis for recommending educational and vocational training goals. The core testing program aids in the identification of those aspects of development which may interfere with growth and learning, and also provides a basis for estimating future growth or progress. For this assessment, four tests are administered (Note 9).

The Stanford Diagnostic Mathematics Test reflects the idea that progress in the development of mathematics skills proceeds from the simple to the complex. There are four levels to the test, each of which assesses mathematical competencies in the interrelated areas of computation, applications numeration, and number system.

The Stanford Reading Diagnostic Test measures reading abilities on four levels. The aspects of the reading process tested are phonetic analysis, word meaning, word parts, word reading, reading comprehension, scanning and skimming, and speed.

The Bennett Mechanical Comprehension Tests are designed to assess the ability of the student to understand mechanical relationships and phsyical laws in 30 different job performance criteria. For students with limited reading skills, the test may be administered by the use of tape-recorded instructions.

The Raven Matrices is an assessment device which measures the student's capacity to apprehend meaningless figures presented for observation and see the relationship between them, to conceive the nature of the figure completing each system and, by so doing, to develop a systematic method of reasoning. Test results provide an indication of the student's intellectual capacity regardless of his or her education.

Following the completion of the core testing program, the psychologist meets with the student to review the background data recorded when the student was admitted, to discuss and interpret the results of the core tests, and to answer any questions which may arise. After this, the psychologist has enough information to advise on the development of a teaching plan for the student (Note 9).

The assessment process also provides for follow-up procedures to ensure that adequate information has been received, and that a relevant instructional program has been devised.

Test results to date indicate that there are wide variations in the abilities of the students, with ranges

from a grade five level through to a university entrance level. They also emphasize the need for individualized programs of academic upgrading for many of the students.

Results of the interviews reveal the fact that many of the applicants and students enrolled at the Training Center are in need of counselling regarding personal, financial and medical problems, so a counsellor has been engaged for the 1983-84 school year.

When funds and space become available, it is intended that a multiple activity testing laboratory will be furnished. This laboratory is expected to provide the means of giving additional depth to the assessment process. In this milieu, the motor abilities and aptitudes of students can be tested in a variety of work-simulation situations.

Curriculum

Instructors in each of the training areas were responsible for designing and developing courses of instruction. Draft copies of course outlines were presented for approval early in September. These outlines listed the general objectives of each course. Specific objectives, testing and recording procedures, and achievement standards were delineated during the course of training. The general objective for each core training area was to bring the student to the mastery level on each step in the learning process through the development of an individualized program which would allow the student to proceed at levels consistent

with his or her physical and intellectual abilities.

During the first three months of operation, it became evident that many of the students were in need of education beyond that which was being provided in the laboratories. Consequently, a new time schedule was introduced, and students were assigned to courses in keeping with their needs. Courses in Consumer Mathematics, Management, Blue Print Reading and Basic Accounting were added to the curriculum. Also, a course in Teacher Training was offered for those instructors who had had no previous teaching experience.

The new courses were begun early in January and were conducted until the latter part of April, 1983. As the results of student assessments and the experiences of instructors had revealed an extremely wide range of abilities in the student population, it was felt that, for some students, remedial instruction in the new areas was advisable, so Plato terminals were installed in an attempt to alleviate this problem.

Core Training Areas--Equipment and Courses

The Computer Laboratory is furnished with seven Apple II-Plus computers with single-disk drives, five Apple IIe computers, and two IBM Personal Computers. Peripheral equipment consists of RAM expansion boards, 33 floppy disk drives, four printers, four modems with communications interface cards, a speech synthesizer and a voice entry unit.

The Apple computers are being used to teach programming concepts which are expected to deal with elementary to advanced programming languages. The Apple II-Plus computers with the single disk drives are used mainly for the introduction to programming. The Apple IIe computers are each equipped with two or more disk drives, 64 kilobytes of RAM and 80-column upper/lower case displays. These added features are necessary for the advanced students, as they use the VCSD Pascal Operating System to program in the FORTRAN and Pascal programming languages. Two of these computers are also equipped with printers for hardcopy output.

The IBM Personal Computers are intended primarily for communications with main-frame computer installations such as the IBM/370 Mainframe and the Amdahl/470. These computers are each equipped with dot-matrix printers and high-speed modems, as well as with a full complement of software (Note 10).

The Computer Programming Courses will require a minimum of two years of training. The entry level course covers both computer literacy and programming in the BASIC computer language. The objectives at the entry level are to provide initial exposure to the use of computers through "hands-on" experiences, and to teach the functions, capabilities and limitations of data processing equipment. The general objectives of the advanced course (computing science) are to prepare students to be competent and

knowledgeable enough to obtain employment as Systems Analysts, Systems Consultants, Programmer Analysts and Systems Programmers. These objectives are being met by providing students access to training with various types of hardware and high-level computer languages. The languages taught include BASIC, FORTRAN, Pascal, and RPG II.

Training, which is focused on the mastery of specific field applications, is expected to provide the graduate with a sound practical base. By fostering both learning and practical experience in the academic setting, the course is intended to provide the student with the skills needed for employment and, at the same time, reduce the need for on-the-job or field training.

The evaluation of students' achievements in this area are based on a mastery system. As the student completes each of the six units of training in the computer literacy component of the introductory course, he or she is tested to determine readiness to proceed. The testing procedure for the six units in the basic programming component follows the same pattern.

The Word Processing Laboratory is equipped with a total of 15 IBM Displaywriter System units. Of these, 13 are linked to three IBM 5218 document printers and are used for training purposes. The other two are set aside for staff use, and are on separate lines to maintain the confidentiality of student records and correspondence. One of the two is linked to an IBM 5218 Document Printer, is

located in the lecture room and is used by the teaching staff. The other is used in the general office, and is set up as a communications link to the IBM 66/70 Laser Printer located in the Accounting Laboratory.

The software in use with the menu-driven processors conforms with established industry standards. Also, the system is compatible with units of various other systems, so graduates who have mastered its use will have a wider range of opportunities for employment (Note 10).

The Word Processing Program addresses the whole area of office automation. Students learn to use the IBM Displaywriter System in doing text applications, in records processing, in file designing, and for network communications. The course is sub-divided into four units of instruction: Basic Levels I and II, Intermediate Level III, and Advanced Level IV. As a student masters the skills in each area, he or she advances to the next level.

It is expected that graduates will have several options open to them. They may join the work force directly as entry level employees, or they may choose to continue in one of the other computing science courses offered. Those who would prefer employment in data center service environments have the option of taking Word Processing as an adjunct to skills training in the use of the IBM System 34 Accounting Computer or of expanding their communications and networking skills by working with the IBM 66/70 Information Distributor.

The Computer Assisted Drafting Laboratory is equipped with three Cascade Graphics Development (CGD) II drafting stations with three Corvus 5Mb disk drives, an Epson character printer, an 11½" x 14" eight-pen plotter, and an Omninet networking system. The laboratory also has two Cascade Graphics Development (CGD) 12.5 drafting stations with two high-speed printer/plotters and a D-sign eight-pen sheet plotter.

The CGD II stations are connected with an 11½" x 14" plotter via the Omninet networking system. These systems are relatively slow in response time and are, therefore, used by the beginning drafting students. The small (11½"x14") plotter is also relatively slow but is adequate for the needs of beginners.

The CGD 12.5 systems are much faster, and are used primarily by the advanced students who are required to do more detailed and complicated assignments. The CAD (Computer Assisted Drafting) drawings are constructed at the stations and, when complete, are reproduced on the plotters. The plotters supply eight-pen colours and very high quality hard copies of the CAD drawings (Note 10).

The Computer Assisted Drafting Course provides for instruction in blueprint reading and drawing interpretation, and introduces methods of attaining maximum levels of efficiency in drafting with several different hardware and software systems. Practical topics such as mechanical, civil, and topographical drafting are covered in the course.

Usually, students in this type of program are required to perform manual drafting prior to the use of the drafting computer. However, for several of the P.H.O.E.N.I.X. students, this is impossible. It has been found that intensive instruction in blueprint reading has eliminated the need for manual drafting (Note 10).

The Computer Assisted Accounting Laboratory is equipped with an IBM System 34 general purpose data processing system. It is intended that this system will serve a two-fold function. Although its major purpose is for the training of students in accounting applications, programs are being designed to process financial records for the Training Center and for businesses which are expecting to subscribe to the service in the future.

The system consists of a central processing unit, five display stations and a printer. The central processing unit contains the storage capacity and logic necessary to control the functions of the system. It is also responsible for the processing of data within the system. This unit has 98k (98,000 bytes) of main storage and an additional 27.1 megabytes (27,100,000 bytes) of hard disk storage, and will host up to 16 display stations, either adjacent or in remote locations with telecommunications linkages. Currently, a link with the IBM 66/70 Laser Printer (located in the same laboratory) is in operation.

The system has five display stations, four of which are used for entering and retrieving data or for requesting

data concerning jobs. The other, a system console, is designed to control the functions of the central processing unit and the printer. It can also be used for the same functions as the other stations. The display stations are menu or command key oriented, providing the beginning student with an easy introduction to the use of the system.

The following modifications were made in order to allow severely physically disabled students to utilize the equipment:

1. A portable keyboard adaptor was made to hold down the command key for a student who is unable to depress two keys at the same time.
2. A power cable was extended so a keyboard could be mounted on the floor, thus enabling one student to encode with his toes. (The keyboard installation device is also used with the IBM Displaywriter.)
3. A wand attachment for a headband was devised to permit a spastic student to encode by nodding his head (Note 10).

The Computer Assisted Accounting Course is designed to provide training in accounting applications. The anticipated duration of the program is two years, although individual students may require more or less training time. Practical work in the program involves the use of the IBM System 34 general purpose data processing system. The software currently being used is designed for a wide range of accounting and other business applications. Examples of skills being taught are data entry for the General Ledger

and for Accounts Payable. Plans have been made to introduce Payroll and Accounts Receivable applications. It is intended that other business applications will be introduced if specific requests are received by prospective employers of the graduates.

Student evaluation records submitted are in the form of written reports which include general observations about student progress, test results, detailed descriptions of student achievements, weaknesses and strengths, and recommendations concerning further evaluation, training and/or retraining.

Students who graduate in this area are expected to have mastered the necessary skills and knowledge for the operation of at least two accounting applications. Employment options open to graduates are as Data Entry Clerks or, for those more advanced, as System Operators or Applications Design and Installation Technicians.

Several problems were encountered in the accounting area. First, the instructor was learning the accounting applications at the same time as he was teaching them. Second, the software supplied by IBM was used initially but, as it was designed for one-company use, it was not suitable for an environment in which several businesses would be using the program at the same time. As only one student at a time could work with an application program, delays in work-flow procedures resulted. Third, although the programs were modified for the second semester, they were still in

the developmental stage and, thus, required correcting. (Software which was designed by an accountant and used for the simultaneous processing of data for a number of companies is being tested for possible use.) Fourth, some of the students had no previous knowledge of accounting procedures, so were required to enrol in a basic accounting course.

The Electronics Laboratory is equipped with five work stations specially constructed to provide adequate clearance for wheelchairs, and with enough tools and equipment to accommodate five students in the Electrical Appliance Repair course. The laboratory also has the capacity for the training of eight students in the Basic Electronics course, although additional equipment is needed. Besides the Basic Electronics Learning Center and tools which were purchased, a multi-meter, an oscilloscope and several sets of electronics hand tools are required (Note 10).

Electrical Appliance and Electronic Equipment Repair Courses. All of the students in this area begin by learning the principles and applications of active and reactive circuitry, and gain practical experience in the use of test instruments. Stress is placed on the development of safety-consciousness, and students are encouraged to design safety methods and aids to minimize their physical handicaps. Those who show special aptitude and interest advance to the repair of computers and other electronic equipment. The objectives of the advanced course are to provide students

with a knowledge of trends in design and manufacturing and of a number of solid state devices, and to enable them to test and repair a variety of types of solid state circuits.

Developments in the First Year

Specialized Services

Curriculum Design. During the first year of the operation of the training center, it became obvious that different categories of students require different treatments. The categories identified were:

1. Those, previously employed, who are handicapped because of accidental injuries;
2. Those, previously employed, who are handicapped by a disease such as Multiple Sclerosis or Muscular Dystrophy; and
3. Those who have been handicapped from birth or early childhood and who have never been employed.

All of the above categories of students require different orientation strategies and course content. The time period to orient each group to the competitive demands of the labor market varies and is contingent upon the ability to obtain high-technology peripheral equipment such as the Versa Braille for the blind or specialized keyboards for the speech-impaired cerebral palsy victims, or to make technical modifications to equipment and furniture. Special courses to orient the three categories of students to the

expectations of the labour market and to their successful competitive roles within that market are also part of the specially designed curriculum. None of these services are available to the physically handicapped in the established, publicly supported, educational institutions.

Curriculum designers took into account the fact that some of the students would not be employable in the public or private sectors of the job market. Hence, students are being trained for employment in three possible settings:

1. For those who are able to communicate orally and who are able to overcome barriers in transportation and the accessibility of the work place, employment in the public and private sectors;
2. For those who have physical handicaps which prohibit their employment in the first setting, either employment in their own home offices, tied in the the P.H.O.E.N.I.X. mini-mainframe; or
3. Employment in the proposed controlled work environment, P.H.O.E.N.I.X. Diversified Services Ltd., with specially designed work areas, procedures and work schedules to minimize handicaps.

Technical Modifications. A technician was employed to design and construct aids and make any modifications to furniture necessary for the comfort and safety of the students. The majority of the changes were made to the furniture, with specially constructed work stations adapted to the needs of individual students. These changes were made

after observations by the technicians and consultations with the individuals involved. A number of mechanical devices were employed to aid in the operation of the computers--keyboard templates, mouth- and head-held wands, and a cable extension to permit special positioning of a keyboard.

Counselling. For the majority of the students, attendance at the training center requires that they must adjust to abrupt changes in living styles and cope with totally new concepts, circumstances, and social situations, and abandon the safety of dependence. These adjustments are very difficult for some, thus counselling is a required service. The counselling function in the first year was performed by regular staff members, but for the coming year, a full-time counsellor has been employed.

The objectives of the counselling service are to promote in the student heightened self-concept, independence, confidence, and social skills, as well as the ability to set realistic goals and the determination to strive toward the achievement of these goals.

Orientation to Core Training Programs. A student new to the school is given the opportunity to explore each area of training by spending an orientation period in each of the laboratories. In this way, he or she may identify a major area of interest and, if a training station is available, commence learning in that area. Training simulation programs designed to orient students to the requirements of various vocations are also used in the orientation process.

Employment Placement Strategies and Achievements

The reluctance of employers to hire the physically disabled is one of the major barriers to employment. To overcome that barrier, strategies which were developed during the pilot study have been continued, and have resulted in some success in the placement of students.

Employer Orientation. Prospective employers are invited to visit the training center to observe the students at work, and to examine the results of this work. This strategy is expected to serve the two-fold purpose of demonstrating the skills of the students and of establishing the bases for their acceptance in the social environment of the work place.

A prospective employer is given the guarantee that if a P.H.O.E.N.I.X. graduate should prove to be inadequately trained for the job, he or she would be brought back to the center for retraining, thus the employer would be spared the onerous task of having to terminate the employment of a physically disabled person.

A Business Advisory Board was recruited to function as a "brain-trust"--to give direction in establishing P.H.O.E.N.I.X. as a model which could be used throughout Canada, and to give information regarding hardware systems, software, training standards, and employment markets. The expertise of members of the Advisory Board is invaluable in

providing advice regarding the current needs of businesses and in predicting future trends. Current membership in the Business Advisory Board is representative of: the direction and management of high technology industry; consulting and accounting in the computer services industry; and the direction of institutional administrative systems.

In utilizing the services of the Advisory Board, P.H.O.E.N.I.X. personnel first attempt to identify problems, and then call on Board members for advice or suggestions for overcoming the difficulties. Members answer such questions as: Is the planned procedure for attaining a specific goal realistic? If not, why? Is the goal realistic? What better procedure(s) could be devised for attaining the goal?

Several problems of current concern in the establishment of objectives and procedures for the training center have been discussed. Among these were the following: the feasibility of instituting distance delivery training programs; the problems anticipated in providing employment by the distance delivery of data for home-bound employees; the development versus the purchase of software; the adaptation of programs to accommodate individual needs; the development of training programs aimed at preparing students for currently available jobs; the types of training required to meet changing technological conditions; the need for academic upgrading for many students; and the need to help students to overcome the psychological effects of accidents or disease.

Work Experience. Several students were placed in temporary work experience situations as an additional facet of their training programs. During the work experience projects, the students maintained contact with P.H.O.E.N.I.X. personnel, who offered support and advice as necessary. Contact with employers or supervisors was also maintained to monitor the students' progress and to receive advice regarding the students' training programs. This practice resulted in the placement of several students in permanent positions.

Employment Placement. From the enrolment of 32 students, a total of nine were employed by September of 1983, some in permanent positions and some in temporary positions. Those who are employed on a temporary basis are expected to return to the Center to complete training programs. The commitment had been for a 10 percent placement rate. In fact, the rate was much higher. Details concerning these individuals, their core training areas, disabilities, employment classifications and salaries, as well as data obtained as a result of interviews with both the employees and their employers, are presented in a September, 1983, Summary Report in Appendix I. (Also included in Appendix I are data regarding physically disabled staff members.) Jobs were obtained for students through liaison with employers, or students obtained work on their own initiatives.

A Controlled Work Environment

It is expected that some severely physically disabled individuals will never be able to work in the public or private sector. In order for these people to achieve economic independence, a controlled work environment is necessary. Such an environment would be provided by the proposed industrial enterprise, P.H.O.E.N.I.X. Diversified Services Ltd., which would be operated in connection with the training center, and would utilize the high technology equipment already in place.

Steps have been taken to begin this enterprise. The requirements for the formation of a limited company are being determined, and the nucleus of a revenue-generating industry is being developed.

Arrangements have been made with representatives of the industries involved to train P.H.O.E.N.I.X. instructors in the diagnosis, repair and maintenance of IBM, Cascade, Hewlett Packard and APPLE equipment. It is intended that students subsequently trained in this area would be employed as technicians in the controlled work environment created by the proposed business organization.

Chapter Summary

The P.H.O.E.N.I.X. Training and Development Center was established in May of 1982 with grants received from the federal and provincial governments. The center, housed

in a wing of the Jasper Place Composite High School, was established to provide vocational training and employment placement services for physically disabled adults to enable them to attain economic independence. The major criterion for the acceptance of each trainee was that he or she have a physical disability or disabilities which have prevented steady employment.

Changes in technology and in the economic climate resulted in changes from the original plans for the core training programs. The result of these changes was the equipping of laboratories and the design of courses in computer operation and programming, word processing, computer assisted drafting, computer assisted accounting, and basic electronics and electrical appliance repair.

Students, after orientation, were enrolled in core training programs in accordance with their interests and the recommendations of staff members, made on the basis of education records, medical assessments and interviews.

During the first operating year, a comprehensive assessment system was designed and put to use in evaluating students already in the training programs, as well as new enrollees. Three categories of students were identified as having distinctive needs. For these three categories--those handicapped by accident, those handicapped by disease, and those handicapped from birth or early childhood--different orientation strategies were used and different courses were designed.

The abrupt changes in lifestyle for a number of the students caused psychological and/or social adjustment problems, so there was a heavy demand for counselling. Plans were made to expand the counselling service for the coming year.

To aid in the employment placement of graduates, a number of procedures were employed. A Business Advisory Board was recruited to give advice regarding the employment market, and about hardware, software and curriculum requirements for training for the jobs identified. Strategies were employed for the purpose of reducing the concerns of prospective employers regarding the hiring of the physically disabled. A work experience program was begun, and resulted in the placement of several students. The initial moves have been made to establish a business organization to provide a controlled work environment for those students who have physical disabilities which prohibit their employment in public or private sector work environments.

CHAPTER VI

PILOT STUDY PARTICIPANTS - CASE STUDY FOLLOW-UP DATA

Introduction

When the P.H.O.E.N.I.X. Training and Development Center opened in the fall of 1982, four of the five pilot study participants were enrolled in training programs in which they were able to apply the skills and knowledge they had acquired through participation in the study. The fifth came to the training center as an employee in an administrative position.

The case study follow-up data, presented in this chapter in profile form, were obtained by the writer during conversations with the participants, their instructors, and administrative staff members, and by observing the participants engaged in their regular activities at the training center. These data were gathered over the 18-month period following the conclusion of the pilot study. Data concerning individual training programs, goals, achievements, changes in attitude, social/psychological adjustments, employment, and employment prospects are given in each profile, where applicable.

Participant Profiles

MJ--Case Study Follow-up Data

MJ, who has extremely limited motor ability but is able to use his hands and arms to some extent, had shown aptitude and interest for producing graphics, so he enrolled in the computer drafting program. The images which he produces appear to be perfectly executed. However, he works very slowly because of his handicaps. His motions while working with the equipment are being monitored, so that some type of technical aid or modification can be devised to enable him to perform the necessary manual operations more easily. Although he works very slowly, the quality of his work is high, so with technical adjustments to aid him in operating the equipment, it is expected that he will have the necessary skill for employment after another year of training, and possibly in a controlled work environment. The necessity for his use of an electrically powered wheelchair limits his prospects of employment in the public or private sectors.

MJ did not complete high school, so is taking courses which will provide him with a broader technical and academic background. He gives the impression of having a very calm temperament, and has had no apparent problems in adjustment to the program demands and the social climate at the Center. He is optimistic about his prospects for eventually becoming financially independent through the

application of the skills and knowledge he is acquiring in the drafting program.

EC--Case Study Follow-up Data

EC, a victim of cerebral palsy, depends on some assistance for personal care, but has some use of her right hand and arm. She attended classes in computer programming on a part-time basis, while continuing her work as a teacher aide at the Glenrose School Hospital. For this work, which she previously did voluntarily, she is now receiving a small monthly honorarium. She is continuing the work in educational programming which she began while participating in the pilot study, and is still using a Voice Entry terminal and the keyboard adaptations devised at that time. She has produced programs of apparent excellent quality for instruction in the primary grades.

Attempts have been made to have Edmonton Public School Board administrators recognize the contribution which EC is making, recognize her potential as a programmer of instructional materials, and employ her in the work for which she has a talent and in which she can make a valuable contribution. Teachers are not given the time during the school day to either learn to program computers or to design and develop educational programs, thus the services of a competent programmer would be invaluable.

On the advice of her programming instructor, EC submitted a program for reading instruction in word

recognition to a publishing company in the hope that it would be purchased. However, the program has apparently been lost, as she has not received a reply. The manner in which the program was submitted--with no protection of her ownership--demonstrates a naivite in business matters, which is evident in many of the students enrolled at the training center, especially in those who have been disabled since birth or early childhood.

During her involvement in the pilot project and as a student, there has been a very noticeable change in EC. When the writer first met her in 1979, she was living in a nursing home with elderly people as companions. She appeared to be unhealthy and depressed, and uncaring about her personal appearance. Now she is an attractive, confident young lady with a friendly attitude and the appearance of health and energy. She is now married, has two stepchildren, and is living away from an institution for the first time since she was a young child.

CD--Case Study Follow-up Data

CD, a victim of cerebral palsy, has a speech impairment. His condition also affects locomotion and fine motor ability, although he has no difficulty in operating a computer. During the past year, he has continued to work on a part-time basis while attending the computer programming classes. CD has exhibited a high degree of enthusiasm and competence in programming, producing work of a very high

caliber. He is being trained for the position of Information and Systems Analyst.

CD's attitude toward the possibility of acquiring full-time employment is positive. The degree of skill which he has demonstrated, together with his apparent determination to succeed, are valuable assets which are expected to ensure his successful job placement.

LB--Case Study Follow-up Data

LB, a triple-amputee, is enrolled in the computer accounting program, where he is preparing for work in accounting applications as a data entry operator. He is taking a course in Accounting as a co-requisite to the data entry training. In working with the System 34 accounting computer, LB continued to use a keyboard template and a mouth-held wand for keyboarding.

Arrangements were made prior to the summer recess of the training center for LB to apply for a position as main-frame operator for the NOVA Corporation. Although a person already on the payroll got the position, LB's application was kept on active file, and his prospects for employment are very good. It is expected that he will be employed the next time there is a vacant position.

During the summer, LB worked as a data entry operator on a 35-week project sponsored by the Associated Commercial Traveller's. As a data entry operator, he used a Victor 9000 computer. Although he had never operated a

Victor previously, he found the transition to its use relatively easy. Part of his responsibility on the job was to train fellow employees in the operation of the computer. When the project was completed, LB returned to the training center to continue his interrupted program.

There has been a very obvious change in LB since his initial participation in the pilot study. He appears to be much more confident in both social and educational settings. In appearance, he has changed from a very casual attitude, and now presents a business-like image. LB was married in the spring of 1983.

MG--Case Study Follow-up Data

MG, a quadriplegic as a result of an automobile accident, continued her contract work after the pilot study concluded. Her contract ended in August, 1982, at which time she was employed as Assistant to the Executive Director of the training center. During the term of her employment, she was responsible for the performance of a number of different types of administrative tasks, including assisting in the preparation of proposals for funds to operate the center. Also, during this time, MG continued to develop her programming skills. As her major interest was in the area of administration, MG resigned from her position after one year, and enrolled at the University of Alberta in a Master's program in Health Care Administration.

MG appeared to be coping well with the social and

psychological problems caused by the abrupt change in her lifestyle which followed her injury. Although she often appeared tired after a day's work, she maintained high standards of performance.

Chapter Summary

Case study follow-up data concerning the five pilot study participants were obtained in the 18-month period following the conclusion of the study. All of these people continued to apply the skills and knowledge acquired as participants--four in vocational training programs and one in employment at the training center. Four were employed at some time during the period; three of these used computer-related skills in their work, either in data entry or in programming. Four of the participants continued in training programs in the first semester (1983); one returned to university in a Master's program.

It was observed that the experiences gained as pilot study participants and, later, at the training center, had beneficial social/psychological effects on all of the participants. This effect was especially noticeable in the attitudes and appearances of LB and EC. All five of the subjects appear to be confident in their ability to find employment and, thus, attain economic independence.

CHAPTER VII

SUMMARY AND CONCLUSIONS, RECOMMENDATIONS FOR FUTURE STUDY, AND OUTLOOK FOR THE FUTURE

Introduction

In this thesis, the writer described pilot research in training severely physically handicapped persons to operate and program computers, and in reducing employer reluctance to employ the handicapped. For the purpose of comparison, two similar studies and a model research institution were described. In order to establish the climate in which the pilot study was initiated, prevailing circumstances and events which led to the study were also described. A time extension granted by the Faculty of Graduate Studies and Research, University of Alberta, permitted the writer to include a summary of activities of the first 18 months of the implementation phase of the research and, also, to include follow-up data concerning the pilot study participants.

In this final chapter, the major findings of the research are summarized, conclusions are drawn, and recommendations for further study are made. The recommendations fall into two categories, those which arose as a direct result of the study and those which are related to the

problem addressed in the study. As a result of the findings of the study and in light of developing trends in electronics technology, a number of observations are made regarding the future directions of vocational training and employment for the physically disabled population.

Restatement of the Purpose of the Study

Many severely physically disabled adults face the prospects of life-long unemployment or underemployment, and the consequent life-long economic dependency. Besides the obvious physical barriers in transportation and the architecture of the workplace, they also face social and psychological barriers to employment. To alleviate this problem, a pilot study was conducted to determine the feasibility of training severely disabled persons for employment in computer-related jobs, and to design a model on which a vocational training institution could be patterned. Specific objectives of the pilot study were the following: to orient the participants in the field of computer technology and to train them to operate and program computers; to design and develop technical aids and operational procedures to overcome physical barriers in the use of computers; to establish an environment which would tend to reduce social and psychological barriers encountered by the participants; to reduce the apprehension of prospective employers regarding the employment of the physically disabled; and to

develop procedures to aid in the employment placement of the participants.

Summary and Conclusions

The major impetus for the pilot study was a research project conducted at the Glenrose School Hospital, a school for severely physically disabled pre-kindergarten to grade twelve students. The main purpose of this project was to design, develop and implement methods of encouraging the development of pre-vocational and vocational skills and knowledge in the students. A lack of research funds and of support by the Edmonton Public School Board restricted the scope of the project, and caused its termination after the first year. However, the findings during the year that the project was in operation indicated that no programs are in effect which would encourage the development of employment-related skills and attitudes, and that graduates are not being prepared, either in a social/psychological sense or with necessary vocational skills and knowledge, for productive employment.

A subsequent survey of 24 physically disabled adults, many of whom were graduates of the afore-mentioned school, revealed patterns of unemployment or of underemployment in unrewarding jobs, or in "make-work" projects sponsored by governments. Although every individual interviewed expressed the desire to acquire the skills and knowledge

necessary to obtain work and, thus, achieve economic independence, the subjects' responses indicated that schooling had not prepared them for employment, and that there was an almost general acceptance of dependency, lack of hope for productive employment, suspicion of the motives of any agent attempting to alter the status quo, and conviction that employers are not only reluctant to hire the physically disabled, but are inclined to equate physical disability with mental impairment. The subjects who had enrolled in programs at post-secondary education institutions were faced with physical barriers which made attendance difficult. Despite the publicity generated by the International Year of the Disabled, there is not enough public awareness of the needs, capabilities and aspirations of the physically disabled, and stereotyping is common.

As a result of the Glenrose research and the survey, it was concluded that in Alberta the severely physically disabled do not have the same opportunities in vocational education as the physically able. Although researchers had determined that effective job placement endeavors resulted from integrated programs which begin in early childhood, and that educational programs which are designed to minimize the effects of handicaps will enhance the individual's prospects for employment (Viscardi, 1967), financial support for the continuation of the research was not forthcoming. Consequently, a decision was made to conduct further research with physically disabled adults.

Proposals were submitted to both the federal and provincial governments requesting capital and operating funds to establish a vocational training institution for the physically disabled. In order to facilitate the receipt of financial support, an eleemosynary association, the P.H.O.E.N.I.X. Foundation, was incorporated under the Societies Act of Alberta, and the pilot phase of the research was initiated. The objective of the pilot study was to demonstrate that the severely physically disabled can acquire competitive work skills through the application of computer technology, and to develop methods of reducing the apprehensions of employers regarding the hiring of physically disabled employees.

The five severely physically disabled participants in the study were oriented to the use of computers, and were given instruction in the operation and programming of the Apple II. Although few modifications to equipment and furniture were necessary, technical aids in the form of mechanical modifications to equipment, devices to facilitate the operation of the computers, and peripheral electronic equipment were employed. Throughout the two-year period in which the study was conducted, liaison with prospective employers was established and maintained.

The pilot study provided evidence that severely physically disabled individuals can become competent in computer-related skills, and can acquire the skills necessary for competition in the job market. While still

receiving instruction, two of the participants applied their newly acquired skills in programming. One, through contacts made by pilot study personnel, contracted with a community college to produce training modules in her field (health care); the other produced instructional modules for use with grade one pupils in the previously mentioned school for the physically disabled, where she worked voluntarily as a teaching aide.

The founding of the P.H.O.E.N.I.X. Training and Development Center provided the environment in which the research could continue. Assessment procedures were developed, and offered in the areas of computer operation and programming, word processing, computer assisted drafting, computer assisted accounting, and electrical appliance and electronic equipment repair.

With only minor modifications to equipment and furniture, simply contrived devices, and the utilization of peripheral electronic equipment, severely physically disabled students are being prepared for employment in three settings: in the public and private sector employment market; in their own home offices, tied in to the P.H.O.E.N.I.X. mini-mainframe; or in a controlled work environment.

Means of diminishing the reluctance of employers to hire the physically disabled were initiated during the pilot study, and continued as a function of the training center. The strategies employed were: direct contacts with prospective employers; demonstrations by students of their

capabilities; the involvement of a Business Advisory Board; and follow-up interviews with both the employed and the employer. By the end of the first year of the Center's operation, nine students (of a student body of 30) were employed, either part-time or full-time. Some of these were placed through the intervention of P.H.O.E.N.I.X. personnel and some got jobs through their own initiatives.

Four of the five pilot study participants enrolled at the P.H.O.E.N.I.X. Training and Development Center when operation commenced in September, 1982, two in computer programming, one in computer assisted drafting, and one in computer assisted accounting. The two computer programming students maintained part-time employment while attending classes on a part-time basis. The computer assisted accounting student was employed during the summer of 1983 on a 35-week project for which he was able to apply skills acquired during the research, and for which he was called upon to instruct fellow workers in the operation of a computer. He returned as a full-time student when the project was completed. Arrangements have been made for his future employment as a Data Entry Operator.

The computer assisted drafting student continued his enrolment at the center. Although he is able to produce graphics of excellent quality, he works very slowly. Because of his lack of mobility, it is expected that a controlled work environment will be necessary for his employment.

The fifth pilot study participant worked until August, 1983, as Assistant to the Executive Director of the training center, at which time she returned to university as a Master's candidate in Health Care Administration.

The ability to perform employment-related functions and the contingent expectations of eventual economic independence have had noticeable social and psychological effects. Individuals, by being given opportunities to gain more control over their environments, have exhibited positive changes in social demeanor, appearances, attitudes toward their vocational abilities and, in general, their self-confidence. In some cases, the changes observed are remarkable.

The successes achieved by both the pilot-study participants and other students at the training center demonstrated that severely disabled individuals can be prepared, both vocationally and in a social/psychological sense, to compete with the physically able in the work place or in environments where their special needs can be accommodated. Also, the successful job placement of trainees demonstrated that liaison with prospective employers can reduce apprehension regarding the employment of the physically disabled.

Recommendations for Future Study

The research described in this thesis revealed a number of areas which are recommended for further study. The recommendations are presented here in two categories: primary recommendations which arose as a direct result of this study; and secondary recommendations which are related to the problem addressed in this study.

The primary recommendations are that further study be conducted in the following areas:

1. The application of rehabilitation engineering in the design of electronic devices and modifications to facilitate the operation of computers by severely physically disabled individuals;
2. Public attitudes toward the phsyically disabled, and the design and development of public education programs to reduce social barriers and barriers to employment;
3. Counselling, career orientation, and procedures for the assessment of the physically disabled; and
4. Controlled work environments for those physically disabled who, because of their particular handicaps, are unacceptable in public or private sector employment environments.

The secondary recommendations are that further study be conducted in the following areas:

1. The identification of the physically disabled in Alberta;

2. The design and development of methods of assessing the potential pre-vocational and vocational aptitudes in physically disabled school children;
3. The design and development of methodology and curricula to meet the special needs of physically disabled pre-kindergarten to grade twelve students;
4. The employment of computers in the education of physically disabled school children;
5. The design of a system for identifying physically disabled students mainstreamed in regular schools, and studies to determine the suitability of and accessibility to educational programs; and
6. The application of computer technology in the distance delivery of educational programs for the physically disabled.

Outlook for the Future

The P.H.O.E.N.I.X. Training and Development Center can supply services to only 50 students. Considering the numbers of physically disabled in the Edmonton area and in the province of Alberta, the capacity of the training center cannot meet the need. There is the possibility, through the expansion of facilities and the increase in equipment and personnel, to supply services to a much greater number of candidates, not only in the Edmonton area, but throughout the province. With the interfacing of the various types of

electronic equipment in-house and the addition of such equipment as the VersaBraille and IBM Talking Typewriter for the blind, the voice-activated Audio System for cerebral palsy victims, and heat-sensitive keyboards, the training center could provide a much broader range of services to a much broader range of clients. With the expansion of the present capabilities for communications, the proposed P.H.O.E.N.I.X. Diversified Services Ltd. could provide, not only for the distance delivery of educational programs, but also for employment in remote locations in the city and in remote areas of the province. With the use of the P.H.O.E.N.I.X. mini-mainframe and distance delivery capabilities, those persons, who are unable because of such impairments as quadriplegia or multiple sclerosis, to work on a full-time basis, could be employed in their own home offices or shops in contracts with the P.H.O.E.N.I.X. corporate structure. Under this arrangement, the contractors would have the advantage of access to P.H.O.E.N.I.X. software programs and to the wholesale purchase of supplies and equipment, as well as to advice and assistance in business operation and management. The corporate structure could also provide for the establishment of a controlled work environment.

It is advocated that the provincial government assume the responsibility, through legislation, to extent to the physically disabled the same educational opportunities as are provided for other citizens.

REFERENCE NOTES

1. The data quoted were taken from a research paper, The Prevalence of the Physically Disabled in Alberta, written in 1978 by Jon Brehaut for the Research and Planning Department of Alberta Social Services.
2. The Design Phase for A Survey of Physically Disabled Albertans was completed in 1983 by the Levy-Couglin Partnership (Calgary) for the Alberta Rehabilitation Council for the Disabled. Funds were supplied by Alberta Social Services and Community Health. At the time of this writing, Alberta Social Services and Community Health had declined further support, so funds for completion of the Pilot, Survey, and Transmittal Phases of the research were not assured.
3. All references to the Glenrose School Hospital research are from the Final Report, Phase I: The Development and Implementation of a Vocational Education Program for the Students of the Glenrose School Hospital, August 30, 1980. A copy of this document is available at the P.H.O.E.N.I.X. Training and Development Center.
4. The founding members of the Board of Directors were: President, Dr. P. Bargen, Superintendent of the Sturgeon School Division; Vice-President, Mr. J. Dabbs, Businessman; and members at large, Mr. R. Jamha,

Commissioner, Worker's Compensation Board; Mr. G. Sather, General Manager and Coach, Edmonton Oiler's Hockey Club; and Dr. H.R. Ziel, Professor, University of Alberta. Dr. Bargen has since resigned and three more members have been added to the Board. At the present time, Mr. Jamha is the President, Mr. G. Illsley (a lawyer and President of Illsley and Company) is the Vice-President, Dr. S. Hunka (Professor, Division of Educational Research, Faculty of Education, University of Alberta) is the Secretary-Treasurer, and Mr. Dabbs, Mr. Sather, Dr. A. Zelmer (Vice-President, Academic, University of Alberta), and Dr. Ziel are Members at Large. Dr. Ziel is also the Executive Director of the P.H.O.E.N.I.X. Training and Development Center.

5. The Application for Incorporation document is kept in the P.H.O.E.N.I.X. Foundation file at the training center.
6. This quotation is from a Proposal for Funding of the P.H.O.E.N.I.X. Training and Development Center for 1982-83, and is available at the P.H.O.E.N.I.X. Training and Development Center.
7. A summary of the achievements of each of the pilot study participants was written by P. Dafoe, an undergraduate student who assisted with training. The data quoted were obtained from this summary.
8. The participants' opinions quoted were expressed during interviews with the writer.

9. The source of information concerning the assessment process in effect at the Training Center is the Assessment Process Draft, 1983, prepared by Dr. William Green of Wm. Green and Associates.

10. Technical information regarding the equipment in the laboratories was supplied by the P.H.O.E.N.I.X. Technician, R. Brown, and by instructors P. Dafoe, B. King and J. Fitzpatrick.

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APPENDIX I

THE P.H.O.E.N.I.X. TRAINING AND DEVELOPMENT CENTER

SUMMARY EMPLOYMENT PLACEMENT REPORT

THE P.H.O.E.N.I.X. TRAINING AND DEVELOPMENT CENTER

SUMMARY REPORT -- Internal Employment, External Employment and Follow-up Interviews

Employment

In-House

During the fifteen months the Training Centre has been in operation, a number of physically disabled persons have been employed. This number includes:

- The Coordinator of Training, a nurse who suffers from Lupus, was previously involved with the pilot study and with initial fund raising activities, and has been employed from May 1, 1983, to the present time.
- The Assistant to the Executive Director, a nurse, is a quadriplegic as a result of an automobile accident. She was a participant in the pilot study, and subsequently did contract work in connection with a project for Grant MacEwan Community College. She joined P.H.O.E.N.I.X. in September, 1982, and resigned on July 31, 1983, to enroll in a Master's program in Health Administration at the University of Alberta.
- The Accountant, who was an accident victim and has had an arm and a leg amputated, joined the staff in January of 1983.

** An ex-student is presently employed but is included in "External Employment", as his wage is being paid by the Worker's Compensation Board.

** An ex-student is gaining field experience by working as a Clerk-Receptionist during July and August, 1983. A position in this type of work has been obtained for her with Hewlett Packard. She expects to begin work in September.

External

A total of 9 persons are employed at present, or have been employed and intend to return to the Training Centre in September to continue programs. Detailed profiles of these persons are given, along with data obtained in follow-up interviews with the subjects and, in some cases, with the employers.

P.H.O.E.N.I.X. Training and Development Center

EMPLOYMENT AND FOLLOW-UP INTERVIEW REPORT

Client and Training Area	Employment and Interview Data
ID 06-050982 WORD PROCESSING	Medical Diagnostic and Functional Disabilities: Left side injuries to shoulder and foot, injuries to liver and spleen--resulted from motor accident. The client has limited use of her left foot and is slightly limited in the use of her left arm. She uses a cane. Job Classification: Receptionist/General Office Clerk, St. Barnabas Center. Particulars: The client's duties include secretarial work and payroll. She is also responsible for entering data in a memory-writer. She also helps her husband, who is also disabled, with the secretarial and accounting duties necessary in the operation of his business. Salary: $5.00 an hour, to be raised to $5.50 an hour following probationary period, and a maximum of $7.50 per hour. Client's Comments: Although she had intended to work part-time in order to be able to spend more time with her family, the client is handling full-time very well. Prior to her enrollment at P.H.O.E.N.I.X. the client had no typing skills. Her training, she says, has helped her "immensely". She says, "The competition for jobs is enormous. Employers all want experienced workers. Without the help of P.H.O.E.N.I.X. and On-Site Placement (a government placement agency for physically and mentally handicapped people) I would not have gotten the job." (The client requested that no interview with her employer be conducted at this time, as she has just begun the job.) Client's Plans for the Future: The client would like to gain enough experience to become an office manager. She plans to continue upgrading her skills, and plans to discuss a continuing program with P.H.O.E.N.I.X. personnel.

Client and Training Area	Employment and Interview Data
ID 21-050982 WORD PROCESSING	Medical Diagnostic And Functional Disabilities: The client has permanent partial paraplegia as a result of a spinal injury. Scoliosis is increasing, causing further degeneration of the spinal nerves and collapsing of the vertibrae, with resulting pain. She is required to wear a back brace, and needs a chair with straight back and arm rests. She has difficulty with walking and balance. Job Classification: Office Manager for a medical clinic, a position she held prior to her attendance at the training school. Particulars: The client learned to use the Display Writer to assist her in her work. She is responsible for administration in a medical clinic in which her deceased husband was a partner. Salary: Unknown. Client's Plans: It was not possible to arrange an interview with the client, as her phone number is not known. However, she had previously stated the intention of continuing in her present position as long as she is physically able.

P.H.O.E.N.I.X. Training and Development Center

EMPLOYMENT AND FOLLOW-UP INTERVIEW REPORT

Client and Training Area	Employment and Interview Data
ID 34-110183 ELECTRICAL APPLIANCE/ ELECTRONICS REPAIR	Medical Diagnostic and Functional Disabilities: An industrial accident caused injury to the client's left arm, leaving him with only 20 to 30 per cent of the normal strength. Job Classification: Maintenance Laborer, with the following duties: structural renovations, painting, cataloguing and tagging furniture and equipment. Particulars: The client is temporarily employed at the P.H.O.E.N.I.X. Centre under the sponsorship of the Worker's Compensation Board. He was selected for this job on the recommendation of the Counsellor because he needs life skills training--to improve his attitude. He will be attending AVC in the fall for academic upgrading. Salary: $5.50 per hour for a 40-hour week. Employer's Comments: The client is capable of handling the work he is responsible for, but requires supervision. Because of the support he is getting from P.H.O.E.N.I.X. and the Worker's Compensation Board, his attitude is improving. His physical handicaps have not affected his performance on this job. Client's Plans for the Future: If the client is successful in his program at AVC, he will be re-enrolled at the P.H.O.E.N.I.X. Center in Electronics and Microcomputer Repair.

Client and Training Area	Employment and Interview Data
ID 07-050982 ELECTRICAL APPLIANCE/ ELECTRONICS	Medical Diagnostic and Functional Disabilities: The client is a paraplegic as a result of a motor accident. He uses a motorized wheelchair which is fitted to allow him to function in an upright position. Job Classification: The client is, at present, self-employed. He has applied for a position as Project Coordinator at the St. Barnabas Center (where his wife works). Particulars: The client is operating an agency for the sale of Steiner Paraplegic Tractors. Salary: At the present, the client's income is contingent upon sales volume. Client's Comments Regarding Training: The client suggested that a course or courses in Marketing would be useful to some of the students. He also strongly recommended that new enrollees, especially those who have never been in the work force, be assessed before beginning training in high-tech areas. Client's Plans for the Future: He expects to become economically independent, and would like to be involved in the design of technical aids for the disabled and/or in the capacity of assessing the employment potential of candidates. He says he feels good about himself, and is confident in the future.

P.H.O.E.N.I.X. Training and Development Center

EMPLOYMENT AND FOLLOW-UP INTERVIEW REPORT

Client and Training Area	Employment and Interview Data
ID 04-050982 MICROCOMPUTER/ MINICOMPUTER PROGRAMMING	Medical Diagnostic and Functional Disabilities: The client suffers from cerebral palsy. He is a quadriplegic, who has limited use of his hands and arms. He uses a motorized tricycle for locomotion. His ability to communicate orally is extremely limited, so he uses an electronic memo-writer. Job Classification: FIRST: Coordinator for the Alberta Regional Action Group for the Disabled. SECOND: Researcher and Writer for the Spokesman Newspaper. Salary: $220.00 per week. Particulars: Arrangements were made with both employers for freetime so the client could continue classes at P.H.O.E.N.I.X. On the second job, the client was responsible for researching and writing for the newspaper. He liked these duties, but left the organization because he felt that "it was being mismanaged, and would likely become bankrupt". He did not have the advantage of using a microcomputer or word processor on the job. Client's Comments Regarding Training: The client "feels very good" about the skills he is learning at P.H.O.E.N.I.X. as he is not only gaining saleable skills, but is also able to use the equipment in communicating with instructors. He suggested that a template for the keyboard would improve his output. Employer Interview: The client requested that no interview be conducted with the employer, as he had been outspoken in his criticism of management. Client's Plans for the Future: He plans on working as a computer programmer. He is financially independent now, and anticipates a higher income following the completion of his studies, which will continue for the next school year.

* This client was a participant in the Pilot Project.

Client and Training Area	Employment and Interview Data
ID 30-061082 MICROCOMPUTER OPERATION AND PROGRAMMING	Medical Diagnostic And Functional Disabilities: The removal of a brain tumor when the client was 10 years old resulted in right-side hemiplegia, with marked weakness in the right hand--no voluntary movement from the wrist down. Job Classification: First--salesman for Westworld Computers. Second: Data entry clerk for the County of Parkland. Particulars: The client said his experience with the microcomputer at P.H.O.E.N.I.X. was related in some respects to the work he did with the data entry system he used in his second job. He is currently unemployed because of a staff cutback. Salary: Unknown Client's Plans for the Future. The client says he did not stay long enough in the course he was taking. He quit because he got a job with Westworld. He plans to try to re-enrol at P.H.O.E.N.I.X. for the coming term.

P.H.O.E.N.I.X. Training and Development Centre

EMPLOYMENT AND FOLLOW-UP INTERVIEW REPORT

Client and Training Area	Employment and Interview Data
ID 01-050982* MICROCOMPUTER PROGRAMMING	Medical-Diagnostic and Functional Disabilities: This client has Cerebral Palsy as a result of Encephalitis suffered when she was an infant. She uses an electric wheelchair for locomotion. She is unable to sit erect with out the help of her chair. She has limited use of her arms and hands. She needs the services of an aide for personal care. Job Classification: Teacher Aide, Glenrose School Hospital. This is a part-time, unsalaried position, however, the client receives an honorarium for work she did on a voluntary basis for three years. Particulars: The client assists teachers in such activities as supervision, correction of students' assignments, and in helping individual students with their assignments. She has produced three microcomputer programs to be used in the Computer Assisted Instruction of primary school students. To date, one of these programs has been used by primary school teachers at Glenrose. Honorarium: $1,000.00 for two half-days weekly during the 180-day school year (approximately 40 days). Employer Interview: It was not possible to contact the teachers with whom the client works, as the summer vacation is in progress. Client's Comments Regarding Training Received: "Attending the P.H.O.E.N.I.X. Centre is great. I really enjoy it. Socially, I get out and meet new people. As a result I'm not as shy. I'm more outgoing. I'm not as self-conscious around people my own age. I don't feel "different" as I did before. I have always been with old people (ie: in the nursing home where she resides). I am gaining more self-confidence as a result of my microcomputer training, and feel that as I gain more skill in programming, I will become more financially independent."

* This client was a participant in the P.H.O.E.N.I.X. Pilot Project.

P.H.O.E.N.I.X. Training and Development Center

EMPLOYMENT AND FOLLOW-UP INTERVIEW REPORT

Client and Training Area	Employment and Interview Data
ID 02-050982* COMPUTERIZED ACCOUNTING	Medical-Diagnostic and Functional Disabilities: The client is a triple amputee as a result of a farm accident involving electricity. One arm was amputated at the shoulder; the other is fitted with a mechanical prosthesis which makes it possible for him to grasp and manipulate objects. A leg prosthesis allows him a limited amount of locomotion, however, he usually uses a manually operated wheelchair. He has also developed exceptionally keen sense of balance, and moves about with ease by hopping on one leg. The client's accident also resulted in the loss of two ribs on the left side. Job Classification: Data entry operator, using a Victor 9000 microcomputer. This is a temporary position. The client is working on a 35-week project at the Associated Commercial Traveller's Center. Particulars: This job is considered to be field experience which will enable the client to relate the training he is receiving to an actual work situation. He is adapting the skills learned at P.H.O.E.N.I.X. to the use of a different data base system. This change-over has presented no serious problems. His experience with the Display Writing system has helped considerably in this regard. Salary: $616.00 per month. This salary is very low in comparison with what the client can expect to receive when he has completed his training program. However, he likes the work and is gaining experience which will contribute to his value to a future employer. Employer's Comments: The client has an excellent attitude toward work. In comparison with others on the project, his attendance was excellent, too. The only time missed was for medical appointments. As he was the only one on the project with any knowledge of computers, was able to teach others on the job. His background made it easy for him to start the new programs on a new system. There were no problems of accessibility at the work place. Client's Plans for the Future: The client applied for a position as a mainframe operator for the Nova Corporation. This job was subsequently filled by an internal applicant. However, the client's application is being kept on active file. Dr. Ziel will be in contact with the Personnel Director at Nova regarding this application. In the meantime, the client will be coming back in September as a student.

* This client was a participant in the P.H.O.E.N.I.X. Pilot Project.